Revised 11/16/2018

Coral Habitat Areas Considered for Habitat Area of Particular Concern Designation in the Gulf of Mexico

Final Amendment 9
to the Fishery Management Plan for the Coral and Coral Reefs of the Gulf of Mexico, U.S. Waters

Including Final Environmental Impact Statement

November 2018

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GULF OF MEXICO CORAL AMENDMENT 9 FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)

Abstract: This FEIS is prepared pursuant to the National Environmental Policy Act to assess the environmental impacts associated with a regulatory action. The FEIS analyzes the impacts of a reasonable range of alternatives intended to protect significant coral communities in the Gulf of Mexico, their habitat, and the species that rely on that habitat.

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
ALS	Accumulated Landings System
AM	accountability measure
AP	advisory panel
ATCA	Atlantic Tunas Convention Act
BOEM	Bureau of Ocean Engineering
BRD	bycatch reduction device
CEA	cumulative effects analysis
CEQ	Council on Environmental Quality
CIOERT	NOAA Cooperative Institute for Ocean Exploration, Research and Technology
Coral FMP	Fishery Management Plan for Coral and Coral Reefs of the Gulf of Mexico
Council	Gulf of Mexico Fishery Management Council
CS	consumer surplus
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
DPS	distinct population segment
DSCRTP	NOAA Deep Sea Coral Research and Technology Program
DWH	Deep-water Horizon MC252
EA	Environmental Assessment
EEZ	exclusive economic zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
ELB	electronic logbook
E.O.	Executive Order
ESA	Endangered Species Act
FAC	Florida Administrative Code
Federal shrimp permit	federal commercial Gulf shrimp moratorium permit
FEIS	final environmental impact statement
FGBNMS	Flower Garden Banks National Marine Sanctuary
FGBNMS Expansion DEIS	FGBNMS Expansion Draft Environmental Impact Statement
FIS	Fishery Impact Statement
FKNMS	Florida Keys National Marine Sanctuary
FMP	Fishery Management Plan
FMU	fishery management unit
FWC	Florida Fish and Wildlife Conservation Commission
GRRS	royal red shrimp endorsement
GSAD	Gulf and South Atlantic Dealer
GSS	General Social Survey

Gulf Council	Gulf of Mexico Fishery Management Council
Gulf	Gulf of Mexico
HAPC	habitat area of particular concern
HMS	Highly Migratory Species
ICCAT	International Convention for the Conservation of Atlantic Tunas
IFQ	individual fishing quota
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Survey and Statistics
MRIP	Marine Recreational Information Program
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOR	net operating revenue
NTL	notice to lessees
OFL	overfishing limit
OY	optimum yield
PS	producer surplus
RFA	regulatory flexibility analysis
RIR	regulatory impact review
RFFA	reasonably foreseeable future actions
ROV	remotely operated vehicle
RQ	Regional Quotient
SEIS	Supplemental Environmental Impact Statement
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office of NMFS
SFA	Sustainable Fisheries Act
SLA	Submerged Lands Act
SPGM	Federal shrimp permit
SRD	Science and Research Director
SRHS	Southeast Regional Headboat Survey
SSC	Scientific and Statistical Committee
South Atlantic Council	South Atlantic Fishery Management Council
VMS	vessel monitoring systems
WTP	willingness to pay

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EXECUTIVE SUMMARY

In 2013, the Gulf of Mexico Fishery Management Council (Council) hosted a workshop that brought together scientists associated with both fisheries and corals to discuss how corals may be affected by fisheries. A recommendation from that workshop was to reevaluate coral areas in the Gulf of Mexico (Gulf) that might warrant special protections. Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) methods of identifying coral and coral habitats that may need protection from activities unrelated to direct harvest of corals include designating sites as essential fish habitat (EFH), habitat areas of particular concern (HAPC) within the EFH, or designating deep-water coral areas via section 303(b)(2)(B).

Essential Fish Habitat (EFH) *– those waters and substrate necessary to fish (including coral) for spawning, breeding, feeding, or growth to maturity.*

Habitat Area of Particular Concern (HAPC) *– a subset of EFH that meets one or more of the following criteria: 1) importance of ecological function provided by the habitat; 2) area or habitat is sensitive to human-induced degradation; 3) the habitat is stressed; 4) is considered rare.*

Each fishery management plan developed under the Magnuson-Stevens Act must identify and describe EFH and minimize, to the extent practicable, adverse effects on these habitats caused by fishing. HAPCs are a subset of EFH that meet specified criteria. An HAPC designation does not confer any additional specific protections to designated areas, but can be used to focus attention on those areas when the Council considers the measures to minimize adverse impacts from fishing, and when the National Marine Fisheries Service (NMFS) conducts the required consultations. Not all existing HAPCs are associated with fishing regulations and not all fishing regulations are consistent across HAPCs. For example, Stetson and McGrail Banks do not prohibit dredge fishing. This amendment considers designating new HAPCs with or without fishing regulations and applying consistent language regarding dredge fishing across all HAPCs in the Gulf that have fishing regulations.

In the Fishery Management Plan (FMP) for Coral and Coral Reef of the Gulf of Mexico U.S. waters (Coral FMP), the Council defined coral EFH as areas where managed corals exist (GMFMC 2004). An area in which corals exist in sufficient numbers or diversity could be designated as an HAPC if it meets one of the HAPC requirements specified at 50 C.F.R. § 600.815(a)(8): importance of ecological function provided by the habitat, habitat that is sensitive to human-induced degradation, located in an environmentally stressed area, or considered rare.

Deep-water coral areas designated under section 303(b)(2)(B) of the Magnuson-Stevens Act are used to protect those corals from physical damage from fishing gear or to prevent loss of, or damage to, fishing gear from interactions with corals. However, the Council is not considering designating deep-sea coral areas under this provision because corals are already protected under the Coral FMP and through the existing EFH designation. Designating deep-sea coral areas would be duplicative and unnecessary. Therefore, this amendment considers actions to establish new HAPCs to better focus attention on the areas of EFH that have been identified, as explained below, as significantly ecologically important, sensitive to human-induced degradation, or are considered rare.

In 2014, the Council convened a working group of scientists to discuss which areas in the Gulf may warrant more specific coral protection. The group identified 47 discrete areas, including existing HAPCs, that it believed should be recognized as containing documented presence of deep-water coral communities and recommended that the Council consider designating these areas as HAPCs and establishing management measures that prohibit fishing with bottom tending gear (Appendix A). The Council's Special Coral Scientific and Statistical Committee (SSC) and Coral Advisory Panel (AP) reviewed these areas at their May 2015 meeting along with members of the shrimping community. Some of these areas were identified as needing further refinement of the boundaries based on available fishing information.

Council staff presented these areas to the Shrimp AP, Reef Fish AP, Spiny Lobster AP, and Law Enforcement Technical Committee as well as royal red shrimp fishermen and bottom longline fishermen. Fifteen priority areas were recommended to be designated as HAPCs with fishing regulations. All priority areas were identified through known abundance of coral, extensive coral fields, and/or species richness or diversity indices that differed from areas in a similar geographic location. The group also recommended eight deep-water areas that warranted consideration as HAPCs without associated fishing regulations. These eight areas contain coral communities that have substantial coral communities or contain corals that are rare.

The purpose of this amendment is to protect coral species and habitat under federal management in the Gulf. The need for this action is to conserve Gulf coral resources and EFH, and to maintain suitable marine habitat quality and quantity to support sustainable fisheries. This includes reviewing current fishing regulations within existing HAPCs and ensuring the regulations are sufficient and appropriate. Table 1 summarizes the management actions included in this amendment and indicates the preferred alternatives selected by the Council.

Table 1. Summary of actions and preferred alternatives considered in this amendment. All HAPC location coordinates are provided in Chapter 2 of this amendment. ***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to highly migratory species buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

Action 1: Modify Existing HAPC Boundary for Regulations in Pulley Ridge
Preferred Alternative 4: Add a new area, Pulley Ridge South Portion A, within the Pulley Ridge North HAPC and adjacent to Pulley Ridge South HAPC with separate regulations. Within the Pulley Ridge South A HAPC, the following regulations will apply: fishing with a bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round.
Action 2 – New Areas for HAPC Status in the Southeastern Gulf
Preferred Alternative 5: Establish a new HAPC named West Florida Wall. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the West Florida Wall HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Action 3 – New Areas for HAPC Status in the Northeastern Gulf
Preferred Alternative 2: Establish a new HAPC named Alabama Alps Reef. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Alabama Alps Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 3: Establish a new HAPC named L&W Pinnacles and Scamp Reef. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the L&W Pinnacles and Scamp Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 4: Establish a new HAPC named Mississippi Canyon 118. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Mississippi Canyon 118 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 5: Establish a new HAPC named Roughtongue Reef. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Roughtongue Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 6: Establish a new HAPC named Viosca Knoll 826. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Viosca Knoll 826 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 7: Establish a new HAPC named Viosca Knoll 862/906. **Preferred Option c.** Prohibit fishing with bottom-tending gear in the Viosca Knoll 862/906 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels. Provide an exemption to the prohibition on fishing with bottom-tending gear for fishermen that possess a royal red shrimp endorsement and are fishing with royal red shrimp fishing gear.
Action 4 – New Areas for HAPC Status in the Northwestern Gulf.
Preferred Alternative 2: Establish a new HAPC named AT 047. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the AT 047 Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 3: Establish a new HAPC named AT 357. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the AT 357 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 4: Establish a new HAPC named Green Canyon 852. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Green Canyon 852 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Action 5 – New Areas for HAPC Status in the Southwestern Gulf.
Preferred Alternative 2: Establish a new HAPC named Harte Bank. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Harte Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Alternative 3: Establish a new HAPC named Southern Bank. **Preferred Option b.** Prohibit fishing with bottom-tending gear in the Southern Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Action 6 – New Areas for HAPC Status Not Recommended to Have Fishing Regulations.
Preferred Alternative 2: Establish a new HAPC named South Reed.
Preferred Alternative 3: Establish a new HAPC named Garden Banks 299.
Preferred Alternative 4: Establish a new HAPC named Garden Banks 535.
Preferred Alternative 5: Establish a new HAPC named Green Canyon 140 and 272.
Preferred Alternative 6: Establish a new HAPC named Green Canyon 234.
Preferred Alternative 7: Establish a new HAPC named Green Canyon 354.
Preferred Alternative 8: Establish a new HAPC named Mississippi Canyon 751.
Preferred Alternative 9: Establish a new HAPC named Mississippi Canyon 885.
Action 7 – Prohibit Dredge Fishing In All Existing HAPCS That Have Fishing Regulations
Preferred Alternative 2: Prohibit dredge fishing in all HAPCs that have fishing regulations.

For analyses and discussion of existing fishing effort in the proposed areas, three datasets were used: the shrimp electronic logbook (ELB) dataset, vessel monitoring system (VMS) data from federally-permitted vessels with bottom-tending gear, and highly migratory species (HMS) permit information including Shark Bottom Longline Observer Program data (Shark Observer data). Each of these datasets is collected by different methods and has different caveats. The Shark Observer data showed that known instances of commercial shark fishing in the proposed areas occurred by vessels that were dually permitted with commercial reef fish and commercial HMS shark permits. Therefore, those vessels are included in the VMS dataset as described below, and social and economic impacts to those vessel owners are included in those described for commercial reef fish fishermen. Recreational HMS fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish.

VMS units are required on all vessels with commercial reef fish permits. VMS data from vessels with bottom-tending gear were used for analyses in this document. Gear types that were considered as bottom-tending were the following: bottom longlines, trawl nets, sea bass pots, traps, automatic reels, bandit rigs, spears, and diving. Only the following gear types were observed in the proposed HAPCs: traps (from 2008-2010), bottom longlines, trawl nets, bandit rigs, and spears. VMS units send pings with vessel identification and location information every hour, with increasing frequency of pings if a vessel nears a closed area. Because of the infrequency of pings, it is very difficult to separate fishing activity from non-fishing activity. Thus, VMS data include both fishing and non-fishing points.

Shrimp ELB data from vessels with federal shrimping permits from 2004 until 2013 were also used to describe fishing activity in the proposed areas. Shrimp ELBs are on vessels selected by NMFS to carry an ELB, but only approximately one-third of all federally permitted shrimp vessels have an ELB. Data points from Shrimp ELBs are collected every ten minutes. Because of the frequency of data points, NMFS is able to determine likely fishing activity from non-fishing activity based on vessel speed. All shrimping activity presented in this amendment is from what has been determined to be likely active fishing and has not been extrapolated to account for the whole fishery.

Action 1: Modify Existing HAPC Boundary for Regulations in Pulley Ridge

Action 1 would modify the existing HAPC boundary for regulations in Pulley Ridge (Figure 1). **Alternative 1** (No Action), would not modify current boundaries or fishing regulations; **Alternative 2** would expand fishing regulations for Pulley Ridge South to the entire Pulley Ridge North HAPC; **Alternative 3** would modify the existing Pulley Ridge South HAPC to include Pulley Ridge South Portion A, with the same regulations throughout. **Preferred Alternative 4** would add a new area, Pulley Ridge South Portion A, within the Pulley Ridge North HAPC and adjacent to Pulley Ridge South HAPC with separate regulations. Within the Pulley Ridge South Portion A HAPC, the following regulations would apply: fishing with a bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round.

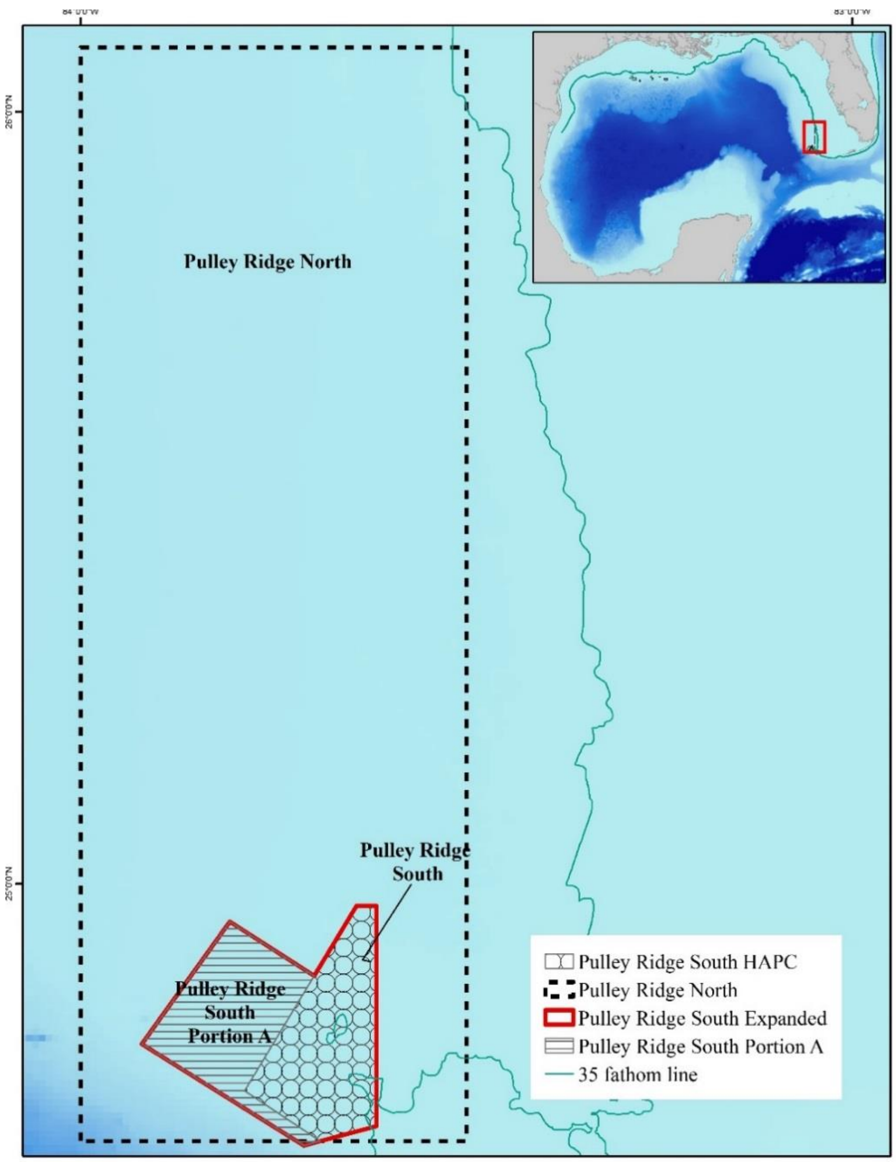

Figure 1. The existing Pulley Ridge North HAPC, Pulley Ridge South HAPC (with regulations), and the Coral SSC recommended expansion of Pulley Ridge South, labeled Pulley Ridge South Portion A.

Alternative 1 (No Action) would have the most negative effects on the physical and biological/ecological environment compared to the other alternatives in this action. Any bottom-tending gear fishing effort that occurs on the sites proposed in Action 1 would continue, as would the potential harm to coral habitat and associated fauna inflicted by such fishing gear at these locations. Negative effects from bottom-tending gear include overturning of bottom habitat from trawls, entanglement of vertical structure from bottom longlines and other gear, crushing and displacement of bottom habitat from anchors and traps, among others.

Alternative 2 would have the most positive effects on the physical and biological/ecological environment because it would prohibit fishing with bottom-tending gear in the largest area. This alternative would allow areas that have been affected by bottom-tending gear to recover and would prevent future bottom-tending gear from entering. Additionally, reducing or eliminating impacts to the physical and biological environments helps to preserve and protect the ecological environment, maintaining the habitat that other organisms and fish depend on for food, shelter, and reproduction. However, mapping and scientific evidence suggests that much of the area encompassed in **Alternative 2** is likely soft substrate, and may not be home to many of the long-lived organisms and corals that are the objective of the HAPC protection. Indirect effects from **Alternative 2** could be increased fishing effort in areas outside of the Pulley Ridge HAPC encompassed by the coordinates in **Alternative 2**. **Alternative 3** would have positive effects on the physical and biological/ecological environments by extending protections from bottom-tending gear to an area that has been documented to have coral.

Preferred Alternative 4 would have the least positive direct physical and biological/ecological effects compared to **Alternative 2** and **Alternative 3**. When compared with **Alternatives 2** and **3**, **Alternative 4** would freeze the footprint of existing fishing activity (i.e. it would not potentially displace fishing activity to other areas), so it would have the least indirect negative physical and biological/ecological effects of fishing effort shifting to other areas. **Preferred Alternative 4** would maintain the extent of fishing so that historical fishing with bottom-tending gear activity that has been documented either via VMS or ELB would continue to be allowed, but no other bottom-tending gear could be used. Since there has been no documented ELB activity, and the VMS activity that has been documented is from vessels that use bottom longlines, **Preferred Alternative 4** would continue to allow bottom longlining while eliminating potential damage from other types of bottom-tending gear.

Alternative 1 (No Action) would not negatively impact the current economic environment. **Alternatives 2**, **3**, and **Preferred Alternative 4** would be expected to result in negative social impacts and direct economic impacts due to the expansion of fishing regulations. **Alternative 2** would be expected to result in the greatest negative direct impacts, followed by **Alternative 3** and then **Preferred Alternative 4**, due primarily to the area of expansion. **Preferred Alternative 4**, while having the same area of expansion as **Alternative 3**, would still allow bottom longline gear, thereby, having less of a social or economic impact on fishermen. The negative social and direct economic impacts expected to result from **Alternatives 2**, **3**, and **Preferred Alternative 4** would be due to areas closed for certain gear types, which would affect both commercial and recreational fishing. Some positive indirect economic impacts may result from **Alternatives 2**, **3**, and **Preferred Alternative 4** by providing protection for coral and habitat on which many fishery species depend, and also for fish targeted commercially or recreationally, if those areas act as a source for new recruits or increase productivity.

Action 2 – New Areas for HAPC Status in the Southeastern Gulf

Action 2 would establish HAPCs in the Southeastern Gulf. **Alternative 1** (No Action) would not establish any HAPCs in the Southeastern Gulf. **Alternative 2** would establish a new HAPC named Long Mound. **Alternative 3** would establish a new HAPC named Many Mounds. **Alternative 4** would establish a new HAPC named North Reed. **Preferred Alternative 5** would establish a new HAPC named West Florida Wall that connects the three areas in **Alternatives 2-4**. For each of the alternatives **Option a,** would not establish fishing regulations, and **Option b**

would prohibit fishing with bottom-tending gear defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels.

Alternative 1 (No Action) is the least conservative and would have impacts to corals and coral habitat similar to those listed in Action 1. **Option a** for **Alternatives 2-4** and **Preferred Alternative 5** would not be significantly different from **Alternative 1** (No Action) for either the physical or biological/ecological environment because it would not have any prohibitions on bottom-tending gear in these areas. However, having the areas identified as HAPCs may result in benefits, as some fishermen may avoid the areas in order to prevent damage to their gear. It also helps focus and prioritize research efforts in Gulf federal waters. **Preferred Option b** for **Alternatives 2**, **3**, **4**, and **Preferred Alternative 5** would be the most beneficial to the physical and biological/ecological community, because it would prevent fishing in areas that are currently not fished. **Preferred Alternative 5** would establish protections to a continuous feature, but to less overall area.

Alternative 1 (No Action) would not be expected to result in any direct or indirect social or economic impacts. **Option a** for **Alternatives 2-4** and **Preferred Alternative 5** would not be significantly different from **Alternative 1** (No Action). New HAPCs without fishing regulations may result in indirect positive economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities. **Preferred Option b** for **Alternatives 2-4** and **Preferred Alternative 5** would have minor negative social or direct economic effects, as neither VMS nor shrimp ELB data indicates significant commercial fishing or shrimping effort in the area, but recreational fishing could be impacted by the gear restriction. Some positive indirect economic impacts may result by providing protection for coral and habitat on which many fishery species depend, and also for fish targeted commercially or recreationally, if those areas act as a source for new recruits or increase productivity.

Action 3 – New Areas for HAPC Status in the Northeastern Gulf

Action 3 would establish HAPCs in the Northeastern Gulf. A**lternative 1** (No Action) would not establish any HAPCs in the Northeastern Gulf; **Preferred Alternative 2** would establish a new HAPC named Alabama Alps; **Preferred Alternative 3** would establish a new HAPC name L&W Pinnacles and Scamp Reef; **Preferred Alternative 4** would establish a new HAPC named Mississippi Canyon 118; **Preferred Alternative 5** would establish a new HAPC named Roughtongue Reef; **Preferred Alternative 6** would establish a new HAPC named Viosca Knoll 826; **Preferred Alternative 7** would establish a new HAPC named Viosca Knoll 862/906. For all alternatives, **Option a** would not establish fishing regulations. **Preferred Option b** for **Preferred Alternatives 2-6** would prohibit fishing with all bottom-tending gear in the areas. **Option c** for **Preferred Alternatives 2**, **3**, and **5** would prohibit fishing with bottom longline, bottom trawl, buoy gear, dredge, and pots or traps (i.e. bottom anchoring would be allowed). **Option c** for **Preferred Alternative 7** would prohibit bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels in the Viosca Knoll 862/906 HAPC. However, it would provide an exemption to the bottom-tending gear for fishermen that possess a royal red shrimp endorsement and are fishing with royal red shrimp fishing gear. For

Alternatives 2-6, the Council selected **Preferred Option b**, and for **Alternative 7**, the Council selected **Preferred Option c.**

Regarding the physical and biological/ecological environments, **Alternative 1** (No Action) is the least conservative and impacts to corals and coral habitat would be similar to those listed in Action 1. **Option a** for **Alternatives 2-7** would not be significantly different from **Alternative 1** (No Action) for either the physical or biological/ecological environment because it would not have any prohibitions on fishing with bottom-tending gear in these areas. However, benefits would be the same as those stated in Action 2. **Option b** for **Preferred Alternatives 2-7** would be the most beneficial to the physical and biological/ecological community because it would prohibit fishing with bottom-tending gear in these areas. **Option c** for **Preferred Alternatives 2**, **3**, **5**, and **7**, could be considered a compromise in that it allows fishing that has been present to continue, but prevents future effects on the biological community from other types of bottom-tending fishing gear.

Regarding the social and economic environment, **Alternative 1** (No Action) and **Option a** for **Preferred Alternatives 2-7** would not be expected to result in any direct impacts. These new HAPCs may result in indirect positive economic impacts as described in Action 2. There is an exception to the prohibition of anchoring within **Option c** for **Preferred Alternatives 2**, **3,** and **5**. Allowing anchoring makes it easier to hold station while fishing with bandit rigs. Thus, the negative social and economic effects on fishermen using vertical line fishing gear would not be as great in **Options c** for **Alternatives 2**, **3**, and **5** compared to the effects expected under **Preferred Option b**. Although there is not a substantial amount of bottom longlining within these proposed HAPCs, the effects would be the same between **Preferred Option b** and **Option c**, as bottom longline gear is prohibited under both options. **Preferred Option b** for **Preferred Alternatives 2, 3,** and **5,** while not quantifiable, would negatively impact bandit gear fishermen who fish the area. **Preferred Option b** for **Preferred Alternatives 4** and **6** is not expected to have significant social or economic impacts because the area is not heavily fished by commercial fishing or shrimping. **Preferred Alternative 7**, **Preferred Option c** would have less negative social or economic impacts than **Option b** because it allows for shrimpers with a royal red shrimp endorsement that have historically used the area to retrieve their gear, to continue to do so.

Action 4 – New Areas for HAPC Status in the Northwestern Gulf

Action 4 would establish HAPCs in the Northwestern Gulf. **Alternative 1** (No Action) would not establish any HAPCs in the Northwestern Gulf; **Preferred Alternative 2** would establish a new HAPC named AT 047; **Preferred Alternative 3** would establish a new HAPC named AT 357; and **Preferred Alternative 4** would establish a new HAPC named Green Canyon 852. For each of the alternatives, **Option a** does not establish fishing regulations, and **Preferred Option b** prohibits fishing with bottom-tending gear defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels.

Regarding the physical and biological/ecological environments, **Alternative 1** (No Action) is the least conservative and would have impacts to corals and coral habitat similar to those listed in Action 1. **Option a** for **Alternatives 2-4** would not be significantly different from **Alternative 1** (No Action) for either the physical or biological/ecological environment because it would not have any prohibitions on bottom-tending gear in these areas. However, benefits would be the same as those stated in Action 2. **Preferred Option b** for **Preferred Alternatives 2-4** would be the most beneficial to the physical and biological/ecological community because it would prevent fishing in areas that are not currently fished.

Regarding the social and economic environment **Alternative 1** (No Action) and **Preferred Alternatives 2-4** with **Option a** would not be expected to result in any direct impacts. These new HAPCs may result in indirect positive economic impacts as described in Action 2. **Preferred Alternatives 2-4** with **Preferred Option b** would have minor negative social or direct economic effects, as neither VMS nor shrimp ELB data indicates substantial commercial fishing or shrimping effort in the area. Recreational fishing could be impacted by the gear restriction. Some positive indirect economic impacts may result by protecting coral and habitat on which many fishery species depend, and also to fish themselves that are targeted commercially or recreationally, if those areas act as a source for new recruits or increase productivity.

Action 5 – New Areas for HAPC Status in the Southwestern Gulf

Action 5 would establish HAPCs in the Southwestern Gulf. **Alternative 1** (No Action) would not establish any HAPCs in the Northwestern Gulf; **Preferred Alternative 2** would establish a new HAPC named Harte Bank; and **Preferred Alternative 3** would establish a new HAPC named Southern Bank. For each of the alternatives, **Option a** does not establish fishing regulations, and **Preferred Option b** prohibits fishing with bottom-tending gear defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels.

Regarding the physical and biological/ecological environments, **Alternative 1** (No Action) is the least conservative, and would have impacts to corals and coral habitat similar to those listed in Action 1. **Preferred Option b** for **Alternatives 2** and **3** would not be significantly different from **Alternative 1** (No Action) for either the physical or biological/ecological environment because it would not have any prohibitions on bottom-tending gear in these areas. However, benefits would be the same as those stated in Action 2. **Preferred Option b** for **Preferred Alternatives 2** and **3** would be the most beneficial to the physical and biological/ecological community, because it would prohibit fishing with bottom-tending gear in these areas.

Regarding the social and economic environment **Alternative 1** (No Action) and **Preferred Alternatives 2** and **3** with **Option a** would not be expected to result in any direct impacts. These new HAPCs may result in indirect positive economic impacts as described in Action 2. **Preferred Option b** for **Preferred Alternatives 2** and **3** would have minor negative social or direct economic effects. Examination of VMS pings along with shrimp ELB data suggests that there is not substantial fishing with bottom-tending gear in **Preferred Alternative 3** and that the area in **Preferred Alternative 2** is not a primary shrimping ground but rather a transit area. Recreational fishing could also potentially be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if operations would have to avoid the new HAPC area for continuous fishing.

Action 6 – New Areas for HAPC Status Not Recommended to Have Fishing Regulations.

Action 6 would establish HAPCs in the Gulf with no fishing regulations. **Alternative 1** (No Action) would not establish the proposed additional HAPCs in the Gulf; **Preferred Alternative 2** would establish a new HAPC named South Reed; **Preferred Alternative 3** would establish a new HAPC named Garden Banks 299; **Preferred Alternative 4** would establish a new HAPC named Garden Banks 535; **Preferred Alternative 5** would establish a new HAPC named Green Canyon 140 and 272; **Preferred Alternative 6** would establish a new HAPC named Green Canyon 234; **Preferred Alternative 7** would establish a new HAPC named Green Canyon 354; **Preferred Alternative 8** would establish a new HAPC named Mississippi Canyon 751 and 272; and **Preferred Alternative 9** would establish a new HAPC named Mississippi Canyon 885.

Alternative 1 (No Action) would have the same effects on the physical and biological environments as **Preferred Alternatives 2-9**; specifically, any bottom-tending fishing effort that occurs in the areas proposed in Action 6 would continue to negatively impact the coral and associated species at these sites. However, due to the depths, it's unlikely that any fishing takes place on these sites; therefore, changes to the physical or biological environments from fishing gear are similarly unlikely. The benefits of establishing an HAPC without fishing regulations would be the same as those stated in Action 2.

Regarding the social and economic environment, **Alternative 1** (No Action) and **Preferred Alternatives 2-9** would not be expected to result in any direct impacts. These areas are not currently fished and the depths restrict fishing effort with bottom-tending gear. The benefits of establishing an HAPC without fishing regulations would be the same as those stated in Action 2.

Action 7 – Prohibit Dredge Fishing In All Existing HAPCs That Have Fishing Regulations

Action 7 would make regulations across all existing and proposed HAPCs in the Gulf that have fishing regulations consistent by prohibiting dredge fishing. **Alternative 1** (No Action) would not implement any new management measures specific to dredge fishing. **Preferred Alternative 2** would prohibit dredge fishing in all HAPCs that have fishing regulations.

Dredge fishing does not currently occur in federal waters of the Gulf, and this action is administrative in nature to make regulations more consistent. **Alternative 1** (No Action) may have negative effects on the physical, and biological/ecological if dredge fishing were to become a fishing method in federal waters of the Gulf, but maintaining status quo is not likely to result in any direct or indirect impacts to the current physical, biological/ecological, social, or economic environments.

For Actions 1-6, there would be similar minor administrative impacts. The National Oceanic and Atmospheric Administration (NOAA) would be responsible for updating current navigational charts, and there would be 15 additional areas with fishing regulations that prohibit fishing with bottom-tending gear for law enforcement to monitor. Action 7 would be a minor modification to current regulations.

FISHERY IMPACT STATEMENT

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires that a fishery impact statement (FIS) be prepared for all amendments to fishery management plans. The FIS contains an assessment of the likely biological, social, economic, and administrative effects of the conservation and management measures on fishery participants and their communities.

Amendment 9 to the Fishery Management Plan (FMP) for Corals and Coral Reefs of the Gulf of Mexico (Gulf), U. S. Waters consists of seven management actions developed by the Gulf of Mexico Fishery Management Council (Council). Table 2 summarizes the actions and preferred alternatives in this document.

Table 2. Summary table of all actions and preferred alternatives.

	Preferred Alternative Summary	**Preferred Option Summary**
Action 1	Modify existing Pulley Ridge HAPC	Expansion area has a fishing with bottom-tending gear prohibition, identical to existing HAPC, but with an exemption for bottom-longlines.
Action 2	New HAPC in southeastern Gulf: West Florida Wall	Prohibits fishing with bottom-tending gear including bottom-longlines and anchoring. Encompasses parts of proposed HAPCs under other alternatives, but is restricted to modified depth zone.
Action 3	6 new HAPCs in northeastern Gulf	All 6 will prohibit fishing with bottom-tending gear including bottom-longlines and anchoring; Viosca Knoll includes exemption for fishermen with royal red shrimp endorsement when fishing with royal red shrimp gear.
Action 4	3 new HAPCs in northwestern Gulf	All 3 will prohibit fishing with bottom-tending gear including bottom-longlines and anchoring.
Action 5	2 new HAPCs in southwestern Gulf	Both will prohibit fishing with bottom-tending gear including bottom-longlines and anchoring..
Action 6	8 new deep-water HAPCs	No regulations attached; no known fishing activity, very deep sites (>984 ft).
Action 7	Dredge fishing prohibition	Prohibit dredge fishing in all existing HAPCs that have fishing regulations.

<u>Biological Effects</u>

Biological effects are positive in the **Preferred Alternatives** for Actions 1 through 4, in that the preferred alternatives and options all designate areas as habitat areas of particular concern (HAPCs) with regulations prohibiting fishing with bottom-tending gear which may adversely affect corals. The preferred alternatives and options in these actions would also have indirect positive effects on the fish and invertebrate populations located within the HAPCs, as the protection to corals inherently protects the habitat used by some of these species. All HMS data are on dually permitted vessels with VMS for reef fish. HMS fisheries were not found to be significantly affected by any of the preferred alternatives in this amendment.

In Action 1, **Preferred Alternative 4** freezes the footprint of existing fishing activity (i.e. it would not potentially displace fishing activity to other areas) with bottom longlines, and eliminates potential damage from other types of bottom-tending gear (bottom trawl, buoy gear [not highly migratory species (HMS) buoy gear], dredge, pots or traps, or anchors from fishing vessels). This would expand the area with fishing regulations (though these regulations would be slightly different from the adjacent existing HAPC) by 93.6 nm^2.

In Action 2, **Preferred Alternative 5**, **Preferred Option b** would have direct positive biological effects on the area encompassed by the West Florida Wall and would convey protections to a continuous feature by prohibiting fishing with bottom-tending gear. This newly created HAPC would increase HAPC coverage in the Gulf by 36.3 nm^2 in depths of 1308 - 1974 ft (218 – 329 fathoms).

Action 3 would establish six additional HAPCs, all with some form of prohibition fishing with on bottom-tending gear. The **Preferred Alternatives 2-7** in this Action would increase HAPC coverage in the Gulf by 70.7 nm^2 in depths of 162 – 4920 ft (27 – 820 fathoms). **Preferred Alternatives 2-6**, **Preferred Option b** would have the most positive direct physical and biological/ecological effects as it would prohibit fishing with bottom-tending gear in the proposed HAPCs. **Preferred Alternative 7**, **Preferred Option c** would allow the existing royal red shrimp fishery using the area to continue to do so, and thus would have direct positive effects on both the physical and biological/ecological environment because it would prevent future use of the area by other bottom-tending fishing gear.

Preferred Alternatives 2-4, **Preferred Option b** in Action 4 would prohibit fishing with bottom-tending gear in three areas, which would protect benthic corals at this site from fishing gear interactions and positively affect the biological environment. These newly created HAPCs would increase HAPC coverage in the Gulf by 17.4 nm^2 in depths of 2622 – 6564 ft (437 – 1094 fathoms).

Actions 5 creates two new HAPCs and the **Preferred Alternatives 2** and **3** with **Preferred Option b** would prohibit fishing with bottom-tending gear in these areas, which would protect benthic corals at this site from fishing gear interactions and positively affect the biological environment. These newly created HAPCs would increase HAPC coverage in the Gulf by 11.6 nm^2 in depths of 162 – 492 ft (27 – 82 fathoms).

In Action 6, **Preferred Alternatives 2** through **9** each have the same effects on the physical and biological environments in their corresponding areas. These HAPCs would not have fishing regulations, but are under consideration for HAPC status because they contain communities considered rare and susceptible to human harm. There would be no changes to the physical and biological environments in these areas. The depths of these areas already restrict fishing effort with bottom-tending gear. These newly created HAPCs would increase HAPC coverage in the Gulf by 135.7 nm^2 in depths of 984 – 4920 ft (164 – 820 fathoms).

Action 7 would make bottom-tending gear prohibitions in all HAPCs consistent regarding dredge fishing gear. Dredge fishing, as a fishing gear type that interacts with the seafloor, has the potential to damage or remove benthic resources indiscriminately. At this time dredge fishing, as a fishing method, is not known to occur in the Gulf exclusive economic zone (EEZ), and it is not anticipated to be used in the future. **Preferred Alternative 2** would be a proactive measure to prevent fishing via dredge fishing in HAPCs should that method become viable in the Gulf.

Economic Effects

Preferred Alternative 4 in Action 1 would add Pulley Ridge South Portion A within Pulley Ridge North. Pulley Ridge South Portion A would implement the same fishing regulations as Pulley Ridge South HAPC, with the exception that use of bottom longline would be permitted within Pulley Ridge South Portion A. Negative direct economic impacts would be expected due to the expansion of fishing regulations, which would affect both commercial and recreational fishing. Some of these negative impacts would be mitigated by fishing activities shifting to other areas. However, commercial fishing may incur added operating costs in order to avoid the new HAPC for continuous fishing. Some positive indirect economic impacts may also result, as the expanded fishing regulations would provide protection not just to the coral and habitat on which many fishery species depend, but also to the fish themselves that are targeted commercially or recreationally, if those areas act as a source for new recruits or increased productivity.

Preferred Alternative 5 with **Preferred Option b** in Action 2 would establish a new HAPC named West Florida Wall and prohibit fishing with bottom-tending gear in that area. Neither VMS nor shrimp ELB data indicates significant shrimping effort in the area, so minor negative direct economic effects are expected to result. However, recreational fishing could still be impacted by the gear restrictions. The impacts to both the commercial and recreational sectors could be mitigated by fishing activities shifting to other areas. Commercial fishing might incur added operating costs in order to avoid the new HAPC for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity.

Preferred Alternatives 2 through **6** with **Preferred Option b** and **Preferred Alternative 7** with **Option c** in Action 3 would establish six new HAPCs in the Northeastern Gulf. Fishing with bottom-tending gear would be prohibited in the new HAPCs, with the exception of Viosca Knoll 862/906 (**Preferred Alternative 7**) where an exception is provided for fishermen possessing a royal red shrimp endorsement and fishing with royal red shrimp fishing gear. While not quantifiable, negative direct economic effects would be expected to result from **Preferred Alternatives 2**, **3**, and **5** with **Preferred Option b**. VMS data indicate that this area is heavily fished, with most fishing occurring with bandit gear which would be affected by the prohibition on fishing with bottom-tending gear. Minimal negative direct economic effects would be expected to result from **Preferred Alternatives 4** and **6** with **Preferred Option b**. VMS data for **Preferred Alternative 6** and both VMS and shrimp ELB data for **Preferred Alternative 4** indicate that the areas for the news HAPCs are not heavily fished. While minimally fished, most of the fishing in the area associated with **Preferred Alternative 6** occurs with bandit gear, which would be impacted by the prohibition on fishing with bottom-tending gear. Negative direct economic effects would also be expected to result from **Preferred Alternative 7** with **Preferred**

Option c. The exemption for fishermen possessing a royal red shrimp endorsement and fishing with royal red shrimp fishing gear avoids greater negative direct economic effects, as nets are commonly being retrieved in this area and trawling itself does not generally occur here. If expansion of federal shrimp permit holders into the royal red shrimp fishery were to occur, the biological environment in the new HAPC would be negatively impacted. In all six new HAPCs, the gear restriction could also negatively impact recreational fishing. The impacts to both the commercial and recreational sectors could be mitigated by fishing activities shifting to other areas. Commercial fishing might incur added operating costs in order to avoid the new HAPC for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity.

Preferred Alternatives 2, **3**, and **4**, with **Preferred Option b** in Action 4 would create, respectively, three new HAPCs named AT 047, AT 357, and Green Canyon 852. All three HAPCs would have a prohibition on fishing with bottom-tending gear. There is little evidence of fishing with bottom-tending gear in these areas, so minor negative direct economic effects would be expected. However, recreational fishing could still be impacted by the gear restrictions. The impacts to both the commercial and recreational sectors could be mitigated by fishing activities shifting to other areas. Commercial fishing might incur added operating costs in order to avoid the new HAPC for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity.

Preferred Alternatives 2 and **3** with **Preferred Option a** in Action 5 would create two new HAPCs named Harte Bank and Southern Bank, respectively, and these two HAPCs would both have a prohibition on fishing with bottom-tending gear. Minor negative direct economic effect would be expected to result, as the area is not determined to be a primary shrimping ground but rather a transit area, based on VMS pings and shrimp ELB data. However, gear restrictions could still impact recreational fishing. The shifting of fishing activities to other areas could mitigate the impacts to both the commercial and recreational sectors. Commercial fishing might incur added operating costs in order to avoid the new HAPC for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity.

Preferred Alternatives 2 through **9** in Action 6 would establish eight new HAPCs. These new HAPCs would not have fishing regulations associated with them; therefore, no direct economic impacts would be expected to result. Some positive indirect economic impacts might result due to the creation of new HAPCs; these HAPCs may draw attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternative 2 in Action 7 would prohibit dredge fishing in all existing HAPCs that have fishing regulations. Since dredge fishing is not a type of fishing that occurs in the Gulf exclusive economic zone (EEZ), neither direct nor indirect economic impacts are expected to result. **Preferred Alternative 2** is an administrative action, by providing consistent management measures.

Social Effects

Social effects may result from the creation, expansion, or modification of regulations associated with an HAPC, if such associated regulations affect human activity such as by prohibiting fishing or anchoring. Because bottom-longlines would be excluded from the list of bottom-tending gear (bottom trawl, buoy gear,[1] pot or trap, and bottom anchoring) that would be prohibited within the expansion of the Pulley Ridge HAPC (Action 1, **Preferred Alternative 4**), any negative effects from Action 1 would be minimal. Apart from the use of the area by bottom-longline fishermen, who target red grouper in this area primarily during the seasonal 35-fathom closure, there is little to no fishing activity or anchoring by fishing vessels known to occur in the area.

Minimal to no effects would be expected from creating a new HAPC on the west Florida shelf (Action 2, **Preferred Alternative 5**), six HAPCs in the northeastern Gulf (Action 3), three new HAPCs in the northwestern Gulf (Action 4), and two new HAPCs in the southwestern Gulf (Action 5, **Preferred Alternatives 2** and **3**); as little fishing activity is known to occur in these areas. Prohibitions on the use of bottom-tending gear including anchoring will be associated with these new HAPCs. No effects would be expected from creating the eight new HAPCs that would be established in other areas of the Gulf (Action 6, **Preferred Alternatives 2-9**), as no attending restrictions on fishing or gear would be established. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted. Finally, no effects would be expected from adding dredge fishing to the list of bottom-tending gear that are prohibited in existing HAPCs (Action 7, **Preferred Alternative 2**), as no dredge fishing is known to occur in the Gulf EEZ.

Administrative Effects

Administrative effects may result from the creation, expansion, or modification of regulations in an HAPC. There would be no effects on the administrative environment for other entities or organizations that may have overlapping activities in the areas of **Preferred Alternative 4** in Action 1, **Preferred Alternative 5** in Action 2, **Preferred Alternatives 2-7** in Action 3, **Preferred Alternatives 2-4** in Action 4, and **Preferred Alternatives 2-3** in Action 5, because these areas already require EFH consultations. Administrative effects to NMFS would include the implementing of regulations for prohibiting fishing with bottom-tending gear, which is within standard operations. **Preferred Alternatives 2-9** in Action 6 would not require any associated fishing regulations or trigger any additional consultations. Identification of EFH, HAPCs, or potential restrictions on fishing activities may have some impact on other federal laws and policies. The implementation of a number of federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires that other federal agencies with responsibility for proposed non-fishing actions consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

[1] Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

Because dredge fishing as a fishing method does not currently occur in federal waters of the Gulf, prohibiting dredge fishing is unlikely to have negative effects on the administrative environment. **Preferred Alternative 2** in Action 7 would be beneficial due to the improved consistency of HAPC fishing regulations in the Gulf. Instating the same management measures across all HAPCs reduces confusion for fishermen, law enforcement, and resource managers.

<u>Safety at Sea</u>
None of the actions in this amendment are anticipated to force vessels to participate in the fishery under adverse weather or oceanic conditions. Therefore, no additional safety-at-sea issues would be created.

CHAPTER 1. INTRODUCTION

1.1 Background

In 2013, the Gulf of Mexico Fishery Management Council (Council) hosted a workshop that brought together scientists associated with both fisheries and corals to discuss how corals may be affected by fisheries. From this workshop, a book was released titled "*Interrelationships Between Coral Reefs and Fisheries*" (Bortone 2014). One of the recommendations from that workshop was to reevaluate coral areas in the Gulf of Mexico (Gulf) that might warrant special protections. Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) methods of identifying coral and coral habitats that may need protection from activities unrelated to direct harvest of corals include designating particular sites as essential fish habitat (EFH) and as habitat areas of particular concern (HAPCs) within the EFH, or designating deep-water coral areas via section 303(b)(2)(B).

Essential Fish Habitat (EFH) *– those waters and substrate necessary to fish (including coral) for spawning, breeding, feeding, or growth to maturity.*

Habitat Area of Particular Concern (HAPC) *– a subset of EFH that meets one or more of the following criteria: 1) importance of ecological function provided by the habitat; 2) area or habitat is sensitive to human-induced degradation; 3) the habitat is stressed; 4) is considered rare.*

Each fishery management plan developed under the Magnuson-Stevens Act must identify and describe EFH and minimize, to the extent practicable, adverse effects on these habitats caused by fishing. Other federal agencies are required to consult with the National Marine Fisheries Service (NMFS) and the Council regarding non-fishing activities that may adversely affect EFH. As explained below, HAPCs are a subset of EFH that meet specified criteria. An HAPC designation does not confer any additional specific protections to designated areas, but can be used to focus attention on those areas when the Council considers measures to minimize adverse impacts from fishing and when NMFS conducts required consultations.

In the Fishery Management Plan (FMP) for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP), the Council defined coral EFH as those areas where managed corals exist (GMFMC 2004). An area in which corals exist in sufficient numbers or diversity could be designated as an HAPC as long as it meets one of the HAPC requirements specified at 50 C.F.R. § 600.815(a)(8): is of significant ecological importance, habitat that is sensitive to human-induced degradation, located in an environmentally stressed area, or considered rare. Corals are especially sensitive to human-induced habitat degradation by fishing and non-fishing activities because of their life history. Some black corals have been aged in excess of 1,000 years and have slow growth rates (Prouty et al. 2011); thus, these species are unlikely to fully recover from destruction or degradation in human timescales.

Black Coral *– corals of the taxonomic order Antipatharia. These corals have a black skeleton and occur from shallow to deep-water.*

Deep-water Coral *– also known as "cold-water corals," are those corals found in waters 164 ft (27 fathoms) or deeper.*

Hermatypic Coral *– a coral capable of building reef structure, and can be species that occur in shallow water and contain symbiotic zooxanthellae, or those species that build reef structures in water depths below the photic zone that are azooxanthellate.*

Mesophotic Coral Zone *– region of overlapping distributions of shallow and deep-water corals. This zone contains corals that exist in low light to no light conditions generally in depths between 100 and 500 feet (16 and 83 fathoms). Mesophotic coral zones are neither exclusively deep-water nor shallow-water corals, but instead identify a transitional depth zone where both deep-water and shallow-water corals can co-occur.*

Octocoral *– corals of the taxonomic order Alcyonacea. These corals are non-reef building corals that provide diverse habitat, structure, and vertical relief over soft bottoms.*

Stony Coral *– corals of the taxonomic order Scleractinia. These corals are the primary reef building corals, though there are solitary species.*

Deep-water coral areas designated under section 303(b)(2)(B) of the Magnuson-Stevens Act are used to protect those corals from physical damage from fishing gear or to prevent loss of or damage to fishing gear from interactions with corals. The areas that may be protected under this provision are those that have been identified in conjunction with the National Ocean and Atmospheric Administration's (NOAA) Deep-Sea Coral Research and Technology Program as deep-sea coral areas. However, the Council is not considering designating deep-sea coral areas under this provision because corals are already managed under the Coral FMP and protected through the existing EFH designation. Designating deep-sea coral areas would be duplicative. Therefore, this amendment considers actions to establish new HAPCs to better focus attention on the areas of EFH that have been identified, as explained below, as significantly ecologically important, sensitive to human-induced degradation, or are considered rare.

In 2014, the Council convened a working group of scientists to discuss which areas in the Gulf may warrant more specific coral protection. The group identified 47 discrete areas, including existing HAPCs, that it believed should be recognized as containing documented presence of deep-water coral communities and recommended that the Council consider designating these areas as HAPCs and establishing management measures that prohibit fishing with bottom tending gear (Appendix A). The Council's Special Coral Scientific and Statistical Committee

(SSC) and Coral Advisory Panel (AP) reviewed these areas at their May 2015 meeting along with members of the shrimping community. Some of these areas were identified as needing further refinement of the boundaries based on available fishing information. These reports were presented to the Council at its June 2015 meeting. Council staff presented these areas to the Shrimp AP, Reef Fish AP, Spiny Lobster AP, and Law Enforcement Technical Committee.

In August 2016, the Council convened the Coral SSC and Coral AP with the Shrimp AP; staff also invited royal red shrimp fishermen and bottom longline fishermen to the meeting to provide input. The group narrowed the focus to 15 priority areas (Table 1.1.1) recommended to have fishing regulations. In January 2018, another area was proposed at the Coral SSC meeting that joins three of the previously identified priority areas. All priority areas were identified through known abundance of coral, extensive coral fields, and/or species richness or diversity indices that differed from areas in a similar geographic location. The group also suggested eight deep-water areas (Table 1.1.1) that warranted consideration as HAPCs based on coral presence, sensitivity to degradation, and rarity of species present; however, the group did not recommend these areas have fishing regulations at this time because of the depths in which these areas occurred. The group recommended that two of the areas identified as priority areas (Pulley Ridge and Viosca Knoll 862/906) have their boundaries revised based on the topography of the bottom features known to have corals and the historical fishing that has been documented in the area. Council staff convened a working group to discuss Pulley Ridge and consulted with biologists and fishermen for Viosca Knoll 862/906. Neither the Pulley Ridge working group nor the group discussing Viosca Knoll 862/906 was able to reach any agreed upon modifications to these boundaries.

Table 1.1.1. Areas identified as priority for HAPC consideration in the Gulf of Mexico.

Site	Area (nm^2)	% of Gulf Federal Waters	Depth in feet (fathoms)
Florida Banks			
Long Mound	13.6	0.007	985-2300 (164-383)
Many Mounds	13.0	0.007	650-2300 (109-383)
North John Reed Site	13.6	0.007	985-3000 (164-492)
West Florida Wall	36.3	0.020	1308-1854 (218-309)
Pulley Ridge			
Alternative 2- Pulley Ridge North	2302.4	1.260	160-660 (27-109)
Alternative 3- Pulley Ridge Expanded	194.2	0.106	160-660 (27-109)
Alternative 4- Expansion portion only	100.7	0.055	160-660 (27-109)
Northeastern Banks			
Alabama Alps Reef	2.7	0.001	160-660 (27-109)
L& W Pinnacles and Scamp Reef	14.3	0.008	325-985 (55-164)
Mississippi Canyon 118	11	0.006	2620-4925 (437-820)
Roughtongue Reef	13.6	0.007	160-660 (27-109)
Viosca Knoll 826	10.3	0.006	1640-2955 (273-492)
Viosca Knoll 862/906	18.8	0.010	980-2300 (164-383)
Northwest Banks			
AT 047	6.8	0.004	3280-4925 (437-820)
AT 357	6.8	0.004	2620-4925 (547-820)
Green Canyon 852	3.8	0.002	4920-6565 (820-1094)
South Texas Banks			
Southern Bank	0.8	0.001	160-330 (27-55)
Unnamed Bank (Harte Bank)	10.8	0.006	160-492 (27-82)
Areas that were recommended to be HAPCs with no fishing regulations			
South John Reed Site	6.8	0.004	1310-4925 (219-820)
Garden Banks 299	6.5	0.004	1310-1970 (219-328)
Garden Banks 535	6.8	0.004	1640-1970 (273-328)
Green Canyon 140 and 272	81.6	0.045	980-3285 (164-547)
Green Canyon 234	13.6	0.007	1310-2955 (219-492)
Green Canyon 354	6.8	0.004	1640-3285 (273-547)
Mississippi Canyon 751	6.8	0.004	1310-1970 (328-383)
Mississippi Canyon 885	6.8	0.004	1970-2300 (219-328)
Gulf Federal Waters (approximate area)	182,752		

Description of Coral

Deep-water corals, which are also referred to as cold-water corals, are defined by the Deep-sea Coral Program of the National Oceanic and Atmospheric Administration (NOAA) as corals occurring in depths of 164 ft (27 fathoms) or deeper (as cited in Hourigan et al. 2007). In keeping with NOAA's definition, in this document deep-water corals are any corals that exist below 164 ft (27 fathoms). The mesophotic coral zone has corals that exist in depth ranges from about 100 ft (17 fathoms) to approximately 500 ft (83 fathoms) (Pugilese et al. 2009; Hinderstein et al. 2010). The most diverse and numerous deep-water coral reef tracts known occur in the Southeastern US and Gulf (Hourigan et al. 2017).

Deep-water corals can live for hundreds to thousands of years and occur in light-limited environments (i.e., depths greater than 150 ft [25 fathoms]) (Hourigan et al. 2007; Prouty et al. 2011). Stony corals can exist as either solitary cups or as colonial species that can build reefs (sometimes over 300 ft tall). Black corals may be shaped like whips, bushes, or fans and provide structure in environments that may be lacking three dimensional habitats. Many species of deep-water coral grow slowly and can take decades to centuries to recover from damage. Growth rates are different for each species and are dependent on environmental conditions. Deep-water corals provide complex habitat for many species of grouper, snapper, shrimp, and crabs. For example, *Lophelia pertusa* is a known habitat for many deep-water fishes and invertebrates (e.g., Kilgour and Shirley 2008).

Unlike shallow-water corals, deep-water corals do not require sunlight. They live in cold waters and derive nutrients from organisms in the water. Corals appear on hard substrates (such as salt domes, cold seeps, basalt) that have oceanic conditions (e.g., temperature, nutrients, and current flow) suitable for survival. Many times, canyon walls, steep escarpments, seamounts, and other areas with vertical relief are the prime areas where corals occur. Compared to the species that exist on these hard substrates with some sort of slope, there are fewer species prevalent in soft substrates. Thus, areas of hard substrate with vertical relief are more likely to have deep-water corals. The Gulf is predominantly soft sediment; naturally existing hard substrate, and subsequently coral coverage, is rare. Deep-water coral distributions are also depth-dependent, meaning that the corals that are prevalent in one depth range are different than the predominant corals existing in a different depth range. To account for species differences in depth, various depth ranges should be considered for protecting different coral species.

Mesophotic coral ecosystems can have both shallow-water corals (usually at the deepest range of their depth limits), some deep-water coral species (usually at the shallower range of their depth limits), and have corals that exist in low light to no light conditions, generally in depths between 100 and 500 ft (16 and 83 fathoms). These corals exist at or below scuba diver depths, but are in water depths too shallow to warrant industrial underwater remotely operated vehicle (ROV) operations. However, there have been many research expeditions in the Gulf in recent years to investigate the presence of mesophotic corals. Several of the HAPCs under consideration encompass these unique ecosystems.

Currently, no take of black or stony coral is allowed in the Gulf exclusive economic zone (EEZ); coral may only be taken when authorized as a scientific research activity, exempted fishing permit activity, or exempted educational activity. In the Council's Generic Annual Catch Limit (ACL)/Accountability Measure (AM) Amendment[2] (GMFMC 2011), octocorals were removed from the fishery management unit (FMU) because the harvest of these corals occurs primarily off the coast of Florida, in state waters, and Florida was managing the quota for harvestable octocorals for the aquarium trade.

Description of Data Used to Estimate Fishing Activity

For analyses and discussion in this document for existing fishing pressure, three datasets were used: the shrimp electronic logbook (ELB) dataset, the vessel monitoring system (VMS) dataset from federally-permitted reef fish vessels with bottom-tending gear, and highly migratory species (HMS) permit information including Shark Bottom Longline Observer Program data (shark observer data). Recreational and other commercial HMS fishing permits issued to vessels in Gulf states were reviewed. There were 1,032 HMS permit holders with addresses in Gulf states; however, no information is available regarding where those permit holders fish. Each of these datasets are collected by different methods and have different caveats. An important difference between the presented VMS data and ELB data is that VMS data include both fishing and non-fishing points and are on all commercially permitted reef fish boats, while the ELB data include only fishing points from approximately one-third of the federal commercial shrimp fleet and show areas of active fishing.

VMS are required on all vessels with commercial Gulf reef fish permits. VMS data from vessels with bottom-tending gear were used for analyses in this document. Gear types that were considered as bottom-tending were the following: bottom longlines, trawl nets, sea bass pots, traps, automatic reels, bandit rigs, spears, and diving. Primarily, VMS data came from allowable gear types in the Gulf and only the following gear types were observed in the proposed HAPCs: traps (from 2008-2010), bottom longlines, trawl nets, bandit rigs, and spears. Some gear types are directly bottom-contact gear while others use bottom anchoring. Additionally, date, time, latitude, and longitude were requested data. VMS send pings with vessel identification and location information to a centralized database maintained by NMFS's Office of Law Enforcement every hour, with increasing frequency of pings if a vessel nears a closed area. Because of the infrequency of pings (once an hour), it is very difficult to separate fishing activity from non-fishing activity. Thus, we used all ping data from VMS vessels with bottom-tending gear in analyses from March 2007 through July 2015.

Shrimp ELB data from vessels with federal shrimping permits from 2004 through 2013 were also used to describe fishing activity in the proposed areas. Shrimp ELBs are on vessels selected by NMFS, but only approximately one-third (~500) of all federally permitted shrimp vessels have an ELB. The ELB program began in 2004, but it took several years for NMFS to place ELBs on all selected vessels; thus, early years in the program are not very representative of shrimping activity. Data points from shrimp ELBs are collected every ten minutes. Because of the frequency of data points, NMFS is able to determine likely fishing activity from non-fishing activity based on vessel speed (derived from the distance between two points), among other

[2]Generic annual catch limits/accountability measures amendment for the Gulf of Mexico Fishery Management Council's red drum, reef fish, shrimp, coral and coral reefs fishery management plans including environmental impact statement, regulatory impact review, and regulatory flexibility act analysis, fishery impact statement. Gulf of Mexico Fishery Management Council. Tampa, Florida.

factors, using a calibrated algorithm. All shrimping activity presented in this amendment is from what has been determined to be probable fishing activity and has not been extrapolated (meaning we did not multiply effort to account for the whole fishery).

Fishing activity by commercial shark fishermen that are dually permitted for reef fish, are included in the VMS data as described above. To determine if there are commercial shark fishermen that are not dually permitted fishing in the proposed areas, the Shark Bottom Longline Observer Program data were used, including non-shark bottom longline sets as well as sets from the Atlantic shark research fishery from 2008-2016. Since 2002, shark bottom longline vessels have been required to take an observer if selected. Depending on the time of year and fishing season, vessels that targeted sharks, possessed a current valid commercial limited access shark permit, and reported fishing with longline gear in the previous year were randomly selected for coverage with a target coverage level of 5-10%. Using Geographical Information System spatial analyses tools, the location of the 135,926 observed bottom longline sets from 2008-2016 were overlaid on the proposed areas to determine if any shark fishing activities would overlap with the proposed HAPCs. The analysis showed five sets, made by four vessels, overlap with the proposed areas (Table 1.1.2). Out of the four vessels, only two sets were made by vessels that are still active in the fishery. These vessels currently hold both a shark limited access permit and a reef fish/federal Gulf shrimp permit. Thus, the analysis showed no sets were made by vessels currently active in the fishery that possess only shark limited access permits. Therefore, no known commercial shark fishing occurs by active vessels that are not dually permitted, and effects and impacts to commercial shark fishermen are included in the assessment for commercial reef fish fishermen. It is possible that fishing activity by recreational fishermen who target only sharks does occur within the proposed HAPCs; however, such fishing effort likely takes place at a very low level.

Table. 1.1.2. Highly migratory species (HMS) fishing activity (2008-2016) in the proposed HAPC. All of the vessels listed have a commercial reef fish permit and are accounted for in the VMS data set.

Year	Number of Sets by vessel (# vessels)	Proposed Coral HAPC	Vessel holds Shark Limited Access Permit in 2017	Vessel holds Reef and/or Shrimp Gulf Permit in 2017
2008	2 (1)	L & W Pinnacles and Scamp Reef	X	X
2010	1 (1)	Alabama Alps Reef	-	-
2010	1 (1)	Pulley Ridge South Portion A	-	-
2012	1 (1)	Pulley Ridge South Portion A	X	X

<u>Description of the Regions of the Gulf</u>

The 15 priority coral areas that were identified for possible fishing regulations fall into distinct regions of the Gulf. For purposes of this amendment, the Gulf was divided into four quadrants to separate Actions 1-5 (Figure 1.1.1). The eight additional areas recommended to be designated as

HAPCs without fishing regulations are addressed separately in Action 6. The Council is considering standardizing all bottom-tending gear regulations for existing HAPCs or at least applying similar language to all HAPCs for gear it does not want deployed in these areas in Action 7.

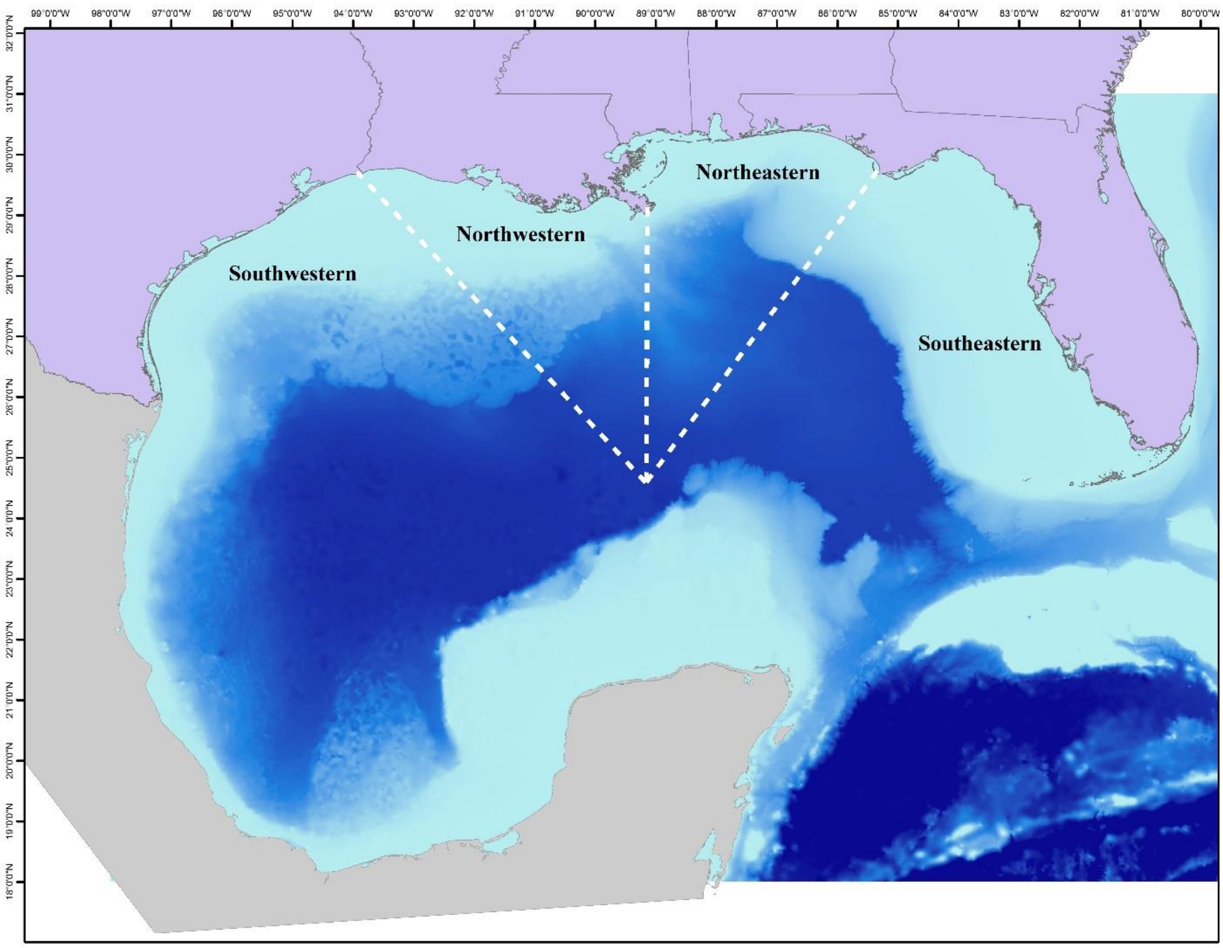

Figure 1.1.1. The four quadrants used to divide the Gulf for Actions 1-5 for organizational purposes.

Southeastern Gulf: The west Florida Shelf has the deepest known hermatypic coral (reef-building coral with zooxanthellae [symbiotic algae]) in U.S. waters. Pulley Ridge has the most species that have been observed for any of the proposed HAPCs, and there are distinct habitat differences between northern and southern Pulley Ridge. Specifically, areas in the northern section of the Pulley Ridge HAPC were characterized as sand, pavement (carbonate substrate created by microbes), or low-relief outcrops, with the pavement and low relief outcrops containing several species of sessile and encrusting invertebrates and algae (GMFMC 2010). Recent work by Reed et al. (2017) has provided new information that warrants re-examination of the existing boundaries of the Pulley Ridge HAPC and perhaps warrants the inclusion of a new area to the south of the Pulley Ridge HAPC. Corals have been found outside the existing boundaries of the Pulley Ridge HAPC area that has regulations, but within the broader Pulley Ridge HAPC. Many of these corals are plate corals that are zooxanthellate (containing symbiotic algae) and thus require light. In deeper areas, black corals and other types of stony corals have been observed. Moving north along the west Florida Shelf is primarily hard bottom that consists of relic shorelines with low to moderate relief (6.5- 26 ft) limestone ledges (Smith 1976; Hine et al. 2008). Up to 14 stony and black coral species have been identified in the Long Mound, North Reed, Many Mounds, and West Florida Wall areas.

Northeastern Gulf: Off the coast of Mississippi, Alabama, and the Florida panhandle in the northeastern Gulf, are a series of low to high relief (6.5 ft to more than 65 ft) bottom features that occur in either clusters or linear ridges (Rezak et al. 1985; Schroeder et al. 1989). One of the areas, Viosca Knoll 826, is one of the best-studied deep reefs in the Gulf. Corals contained within proposed areas in the northeast region range from mesophotic corals to deep-water corals, and the number of coral species in some proposed areas exceeds 20 (including octocorals).

Northwestern Gulf: Off the coast of Louisiana, the northwestern Gulf is very broad, predominantly comprised of soft sand and clays from riverine sediments, and is divided from the northeastern Gulf by the DeSoto Canyon (Gittings et al. 1992; Brooke 2017). In the northwestern Gulf, salt domes dominate the hard substrate north of Matagorda Bay, Texas (e.g., the Flower Garden Banks National Marine Sanctuary) (Rezak et al. 1990; Roberts 2011). Many species of black coral, stony coral, and sea fans (octocorals) are present in this region.

Southwestern Gulf : Drowned barrier reefs provide the hard substrate south of Matagorda Bay for south Texas Banks (Southern Bank and Harte Bank) (Rezak et al. 1990; Roberts 2011). Many species of black coral, stony coral, and sea fans (octocorals) are present in this region. Some areas have deep-water species, but most of the corals that are present on the south Texas banks would be characterized as mesophotic. These areas have between five and six different species of black corals, two to four species of stony corals, and a handful of octocorals.

<u>Current Closed Areas, Fishing Regulations, and Existing HAPCs</u>

Not all existing HAPCs have regulations (Table 1.1.2) and not all regulations are consistent across HAPCs. For example, Stetson and McGrail Banks do not prohibit dredge fishing. Dredge fishing is a fishing method in which the dredge is dragged across the sea floor, either scraping or penetrating the bottom. This amendment standardizes fishing regulations regarding dredge fishing for all HAPCs that have fishing regulations.

Table 1.1.2. Existing National Marine Sanctuaries, Marine Reserves, and HAPCs in the Gulf. Regulations for each area are summarized. Area is in square nautical miles. Total area of federal waters in the Gulf is 182,752 nm^2.

Site	Area (nm^2)	% of Federal Waters in Gulf	Current Status	Regulations
Stetson Bank	1.7	0.0009	Sanctuary/ HAPC	No fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels year round.
East and West Flower Garden Banks	64.6	0.035	Sanctuary/ HAPC	No fishing with bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels year round.
McGrail Bank	14.1	0.008	HAPC	No fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels year round.
Madison-Swanson	115.2	0.063	Reserve/ HAPC	No possession of Gulf reef fish except aboard a vessel in transit with fishing gear appropriately stowed year round. No fishing for any species from November through April, and possession of any fish species is prohibited except for such possession aboard a vessel in transit with fishing gear appropriately stowed. Surface trolling is the only allowable fishing activity May through October. These provisions do not apply to highly migratory species.
Florida Middle Grounds	339.3	0.186	HAPC	No fishing with bottom longline, bottom trawl, dredge, and pots or traps year round.
Pulley Ridge*see note at bottom	100.7*/ 2302.4*	0.055/1.260	HAPC	*No fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels year round.
Steamboat Lumps	106.7	0.058	Reserve	No possession of Gulf reef fish except aboard a vessel in transit with fishing gear appropriately stowed year round. No fishing for any species from November through April, and possession of any fish species is prohibited except for such possession aboard a vessel in transit with fishing gear appropriately stowed. Surface trolling is the only allowable fishing activity May through October. These provisions do not apply to highly migratory species.
The Edges	390	0.213	Reserve	No fishing for any species from January through April, and possession of any fish species is prohibited except for such possession aboard a vessel in transit with fishing gear appropriately stowed. These provisions do not apply to highly migratory species
Tortugas Marine Reserves	66.7	0.036	Reserve/ HAPC	No fishing for any species or anchoring by fishing vessels year round.
Alderdice Bank	5	0.003	HAPC	None
Bouma Bank	11	0.006	HAPC	None
29 Fathom Bank	11	0.006	HAPC	None
Geyer Bank	13.1	0.007	HAPC	None
Jakkula Bank	35	0.019	HAPC	None
MacNeil Bank	8.1	0.004	HAPC	None
Rankin-Bright Banks	81.1	0.044	HAPC	None
Rezak-Sidner Banks	20	0.011	HAPC	None
Sonnier Bank	9.0	0.005	HAPC	None
Total Area of Federal waters of HAPCs with regulations	1,199	0.656		Based on the HAPCs in this table which have been designated as having fishing regulations in this table. This includes the portion of Pulley Ridge **that is** subject to fishing regulations.
Total area of federal waters including HAPCs without fishing regulations	2,395	1.311		Based on the HAPCs in this table which have been designated as **not** having fishing regulations in this table. This includes the portion of Pulley Ridge that **is not** subject to fishing regulations

Note: *Only a small portion of Pulley Ridge currently has regulations, though there is a larger rectangle that does not have regulations.

1.2 Purpose and Need

Purpose for Action

The purpose of this amendment is to protect coral species and habitat under federal management in the Gulf of Mexico.

Need for Action

The need for this action is to conserve the Gulf of Mexico coral resources and essential fish habitat and to maintain suitable marine fishery habitat quality and quantity to support sustainable fisheries.

1.3 History of Management

On August 22, 1984, NMFS published the final rule to implement the Coral FMP. The rule was prepared jointly by the Gulf Council and South Atlantic Fishery Management Council (South Atlantic Council) due to the susceptibility of coral and coral reefs to physical and biological degradation, and the need to optimize the benefits from these resources while conserving the coral and coral reefs. The Coral FMP addressed three objectives:

1) Established unique HAPC for coral which were currently or potentially threatened;
2) Prohibited the taking or destruction of stony corals and sea fans (*Gorgonia flabellum* and *Gorgonia ventalina*) except under scientific permit;
3) Provided permit systems for the taking of certain corals for scientific and educational purposes and harvesting fish or other marine organisms using toxic chemicals in coral habitat.

The management unit consisted of the coral and coral reefs in federal waters including hard bottom, deep-water banks, patch reefs, and outer bank reefs. It specifically established four HAPCs - East and West Flower Garden Banks and Florida Middle Grounds in the Gulf, and the Oculina Banks in the South Atlantic - where the use of any fishing gear interfacing with the bottom (i.e., bottom trawls, traps, pots, and bottom longlines) was prohibited.

In 1989, NMFS published revised guidelines for FMPs that addressed the Magnuson-Stevens Act national standards. These guidelines require each FMP to include a scientifically measurable definition of overfishing and an action plan to prevent or stop overfishing should it occur. The Gulf Council and South Atlantic Council reviewed these requirements and concluded that because harvest of prohibited corals was limited to scientific and educational purposes, overfishing of corals could not occur. NMFS review determined that an amendment to the plan was necessary because it did not include a measurable definition of overfishing.

Amendment 1/Environmental Assessment (EA) (1990)

Amendment 1 defined the management unit to include octocorals. Specifically the management unit was defined as consisting of coral reefs, stony corals, and octocorals including the two sea fans *Gorgonia ventalina* (venus sea fan) and *Gorgonia flabellum* (common [purple] sea fan) in the Gulf and South Atlantic EEZ. The amendment defined coral reefs as including hard bottom, deep-water banks, patch reefs, and other outer bank reefs; stony corals included species belonging to Class Hydrozoa (fire corals and other hydrocorals) and Class Anthozoa, Subclass Zoantharia (stony corals and black corals); and octocorals included in Class Anthozoa, Subclass Octocorallia (GMFMC and SAFMC 1990).

This amendment also established permit and reporting requirements for the harvest of octocorals for scientific or educational purposes and limited the recreational and commercial harvest of allowable octocorals not to exceed 50,000 colonies per year. Recreational harvest permits were implemented that limited the harvest of octocorals other than sea fans to a bag limit of six colonies per person per day, and commercial harvest permits were implemented that had no bag limit. Amendment 1 also defined the optimum yield (OY) as zero for coral reefs, stony corals, sea fans, and octocorals in the EEZ except as authorized for scientific or educational purposes, with harvest expected to be approximately 308 lbs (140 kg) per year; and overfishing was defined as an annual level of harvest that exceeded the OY (GMFMC and SAFMC 1990).

The incidental take of corals in other fisheries was addressed by implementing the requirement that those colonies be returned to the water in the general area of capture as soon as possible. An exception was provided for groundfish, scallop, and other similar fisheries where the entire unsorted catch is landed. In such instances, the corals could be landed but not sold, and allowable octocorals taken as bycatch without a state or federal permit were to be treated as prohibited species (GMFMC and SAFMC 1990).

Emergency Rule (1994)

To manage the harvest of live rock and prevent serious damage to habitat in the Gulf until long-term measures could be implemented through Amendment 2, NMFS published an emergency rule effective May 16 through August 18, 1994, and extended the rule, with modifications, through November 12, 1994 (59 FR 42533; August 18, 1994). At the request of the South Atlantic Council, NMFS published an emergency interim rule to manage harvest of live rock on June 27, 1994 (59 FR 32938), effective through September 26, 1994, and extended the rule through December 25, 1994 (59 FR 47563; September 16, 1994). When the 1994 quota was reached, the live rock fishery in the South Atlantic EEZ was closed November 1, 1994, through December 25, 1994 (59 FR 54841; November 2, 1994).

Amendment 2/Supplemental Environmental Impact Statement (SEIS) (1994)

Amendment 2 to the Coral FMP, addressed management of the harvest of live rock, and defined live rock as living marine organisms or an assemblage thereof attached to a hard substrate (including dead coral or rock and the substrate to which it is attached), and added it to the FMU (GMFMC 2001). In the South Atlantic EEZ the substrate was defined as within 1 inch of the octocoral base, whereas in the Gulf it was within 3 inches of the base (GMFMC and SAFMC 1994). This amendment contained a phase-out of wild live rock harvest and prohibited all wild live rock harvest in the South Atlantic EEZ from north of Dade County, Florida as of January 1, 1996; prohibited chipping throughout the jurisdiction of the South Atlantic Council immediately; established the prohibition of all wild live rock harvest in the Gulf EEZ as of January 1, 1997 (and specified the prohibition of harvest for personal use); and prohibited chipping in the Gulf EEZ north and west of the Pasco-Hernando County line to the Florida-Alabama border. (GMFMC and SAFMC 1994).

In the final rule implementing Amendment 2, the joint FMP was separated into two FMPs; the FMP for Coral, Coral Reefs, and Live/Hard Bottom Habitats of the South Atlantic Region under the jurisdiction of the South Atlantic Council and the Coral FMP under the jurisdiction of the Gulf Council.

Amendment 3/EA (1995)

Amendment 3 established additional live rock regulations including: an annual quota during phase-out of wild harvest; revision of trip limits; a closed area off Florida's Panhandle; redefinition of allowable octocorals; and limited personal use harvest.

The amendment clarified that allowable octocorals were erect, non-encrusting species of Subclass Octocorallia, except the prohibited sea fans *Gorgonia flabellum* (venus sea fan) and *Gorgonia ventalina* (common [purple] sea fan), including only the substrate covered by and within 1 inch of the base, and that this applied only to allowable octocorals in areas where live rock harvest was prohibited (GMFMC 1995).

Generic Amendment for Addressing Essential Fish Habitat Requirements (Generic EFH Amendment) (1998)[3].

The Generic EFH Amendment identified and described EFH based on known distributions of corals specified in the Coral FMP, and for 26 representative managed fish species. In marine waters of the Gulf, EFH is defined as all marine waters and substrates (mud, sand, shell, rock, hard bottom, and associated biological communities) from the shoreline to the seaward limit of the EEZ, where those coral species commonly occur.

The amendment identified threats to EFH from fishing and non-fishing activities, proposed options to conserve and enhance EFH, and identified research needs. No management measures were implemented through this amendment (GMFMC 1998).

Generic Sustainable Fisheries Act Amendment (1999)

The Generic Sustainable Fisheries Act Amendment provided scientific definitions for stocks managed by the Council including: maximum sustainable yield, OY, maximum fishing mortality

[3] Amendments to the Coral FMP that were implemented through the Generic EFH and Generic Sustainable Fisheries Act amendments were not given numbers at the time of their development. The Generic Tortugas Amendment was incorrectly identified as the fourth amendment to the Coral and Coral Reef Fishery management plan.

thresholds) and minimum stock size thresholds. The OY was set to zero for all stony and black coral species, so no overfishing or overfished thresholds were set.

Generic Amendment Addressing the Establishment of the Tortugas Marine Reserves (Generic Tortugas Amendment) (2001)

The Generic Tortugas Amendment established marine reserves in the vicinity of the Dry Tortugas, Florida, based on significant marine resources. The Tortugas Marine Reserves lie within federal waters and in the jurisdiction of the National Park Service and the Florida Keys National Marine Sanctuary (FKNMS). The amendment established fishery regulations under the Magnuson-Stevens Act within portions of the reserve that reside in federal waters. Those regulations were then adopted as Sanctuary regulations, as outlined in the Protocol for Cooperative Fisheries Management of the FKNMS Final Management Plan (NOAA 1996). The regulations prohibit fishing for any species and anchoring by fishing vessels within the Tortugas marine reserves.

Generic Amendment 3 Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the Gulf of Mexico (2005)

This amendment addressed a court finding that the original amendment EA did not comply with the requirements of the National Environmental Policy Act, requiring NMFS to prepare a more thorough analysis. The amendment established additional HAPCs, restricted fishing activities within HAPCs to protect EFH, and required a weak link in bottom trawl gear to protect EFH.

The amendment established the East and West Flower Garden Banks HAPCs and prohibited fishing with a bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels within those areas. It also established Pulley Ridge HAPC, Stetson Bank HAPC, and McGrail Bank HAPC, and prohibited fishing with a bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels in Stetson and McGrail Banks, and a portion of Pulley Ridge (GMFMC 2005).

Generic Annual Catch Limits and Accountability Measures Amendment (Generic ACL/AM Amendment) (2011)

The Generic ACL/AM Amendment was Amendment 8 to the Coral FMP. The amendment removed octocorals (Class Anthozoa, Subclass Octocorallia, Family Gorgoniidae) from the FMP. The removal of octocorals as a federally managed species in the Gulf provided the opportunity for states to manage the resources in federal waters adjacent to their state waters.

In April 2011, the Gulf Council and South Atlantic Council received a letter from Florida Fish and Wildlife Conservation Commission (FWC), stating the FWC agreed to manage the allowable octocoral fishery in both Florida state waters and federal waters adjacent to the state. The South Atlantic Council decided to retain allowable octocorals in their Coral FMP but allow the FWC to assume management of octocorals off Florida. The FWC extended Florida's octocoral regulations into federal waters and the regulations were modified to establish an annual quota for allowable harvest in state and federal waters off Florida (GMFMC 2011).

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 – Modify Existing HAPC Boundary for Regulations in Pulley Ridge

Pulley Ridge North and Pulley Ridge South were established as habitat areas of particular concern (HAPC) in Generic Essential Fish Habitat (EFH) Amendment 3 in 2005 (GMFMC 2005). In the amendment, a larger rectangle (Pulley Ridge North) was established as an HAPC, but only a small area in the southern portion of the rectangle (Pulley Ridge South) was given fishing regulations (Figure 2.1.1) in order to protect the densest living coral habitat that was known to exist at that time.

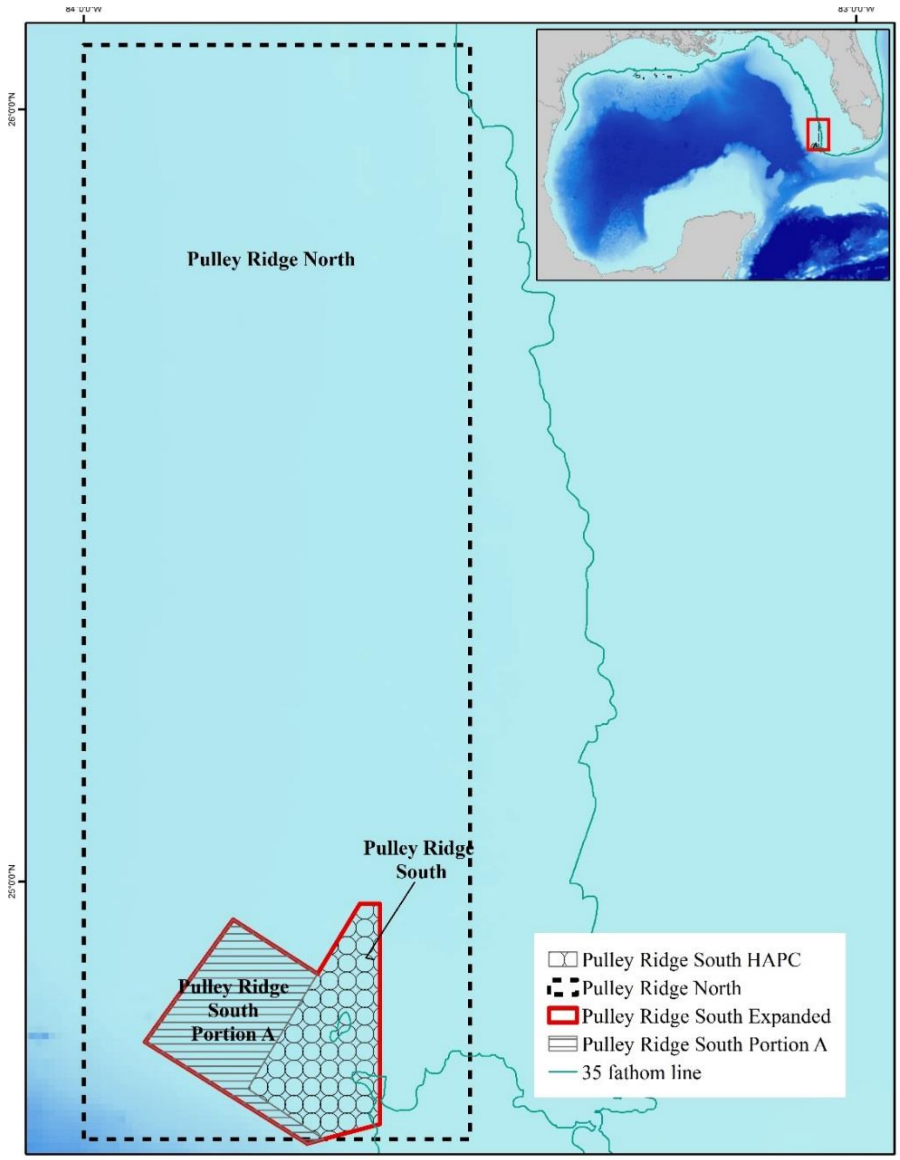

Figure 2.1.1. The existing Pulley Ridge North HAPC, Pulley Ridge South HAPC (with regulations), and the Coral SSC recommended expansion of Pulley Ridge South, labeled Pulley Ridge South Portion A.

Alternative 1: No Action – Do not modify the existing Pulley Ridge South HAPC or change the area subject to fishing regulations. Current regulations to include: fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC (50 CFR 622.74(d)). Pulley Ridge South HAPC is currently bound by the following coordinates (converted from degrees, minutes, seconds to degrees, decimal minutes), connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Depth Range: 162-654 ft (27-109 fathoms) Area: 100.7 nm^2	A	83°38.550’	24°58.300’
	B	83°37.000’	24°58.300’
	C	83°37.000’	24°41.183’
	D	83°41.367’	24°40.000’
	E	83°47.250’	24°43.917’
	A	83°38.550’	24°58.300’

Alternative 2: Expand the fishing regulations for Pulley Ridge South HAPC (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC) to the entire Pulley Ridge North HAPC to be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge North Depth Range: 162-654 ft (27-109 fathoms) Area: 2302.4 nm^2	A	84°00.000’	24°40.000’
	B	84°00.000’	26°05.000’
	C	83°30.000’	26°05.000’
	D	83°30.000’	24°40.000’
	A	84°00.000’	24°40.000’

Alternative 3: Modify the existing Pulley Ridge South HAPC to include Pulley Ridge South Portion A, with the same regulations throughout (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC). The new Pulley Ridge South HAPC will be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Expansion Depth Range: 162-654 ft (27-109 fathoms) Area: 194.2 nm^2	A	83°38.550’	24°58.300’
	B	83°37.000’	24°58.300’
	C	83°37.000’	24°41.183’
	D	83°41.366’	24°40.000’
	E	83°42.648’	24°39.666’
	F	83°55.240’	24°47.555’
	G	83°48.405’	24°57.065’
	H	83°41.841’	24°52.859’
	A	83°38.550’	24°58.300’

Preferred Alternative 4: Add a new area, Pulley Ridge South Portion A, within the Pulley Ridge North HAPC and adjacent to Pulley Ridge South HAPC with separate regulations. Within the Pulley Ridge South A HAPC, the following regulations will apply: fishing with a bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round.[4] Pulley Ridge South Portion A will be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Portion A Depth Range: 162-654 ft (27-109 fathoms) Area: 93.6 nm^2	A	83°41.366'	24°40.000'
	B	83°42.648'	24°39.666'
	C	83°55.240'	24°47.555'
	D	83°48.405'	24°57.065'
	E	83°41.841'	24°52.859'
	F	83°47.250'	24°43.917'
	A	83°41.366'	24°40.000'

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

Discussion:

At the meeting of the Coral Working Group in 2014, new coral presence information in Pulley Ridge was provided. This information stemmed from a multi-year study characterizing the coral reefs at Pulley Ridge conducted by a group of scientists and is summarized in detail in the National Oceanic and Atmospheric Administration (NOAA) Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT) Final Cruise Report (Reed et al. 2017); this report and the references therein are summarized below. The different alternatives expand the regulated area of Pulley Ridge from no additional area regulated up to an additional area of 2200 nm^2 (Table 2.1.1).

Table 2.1.1. Sites proposed in Action 1 for Pulley Ridge with the area of each proposed alternative. Minimum and maximum depths are provided.

Site	Minimum depth ft (fathoms)	Maximum depth ft (fathoms)	Area (nm^2)
Pulley Ridge South (Alternative 1)	162 (27)	654 (109)	100.7
Pulley Ridge North (Alternative 2)	162 (27)	654 (109)	2302.4
Pulley Ridge South Expansion (Alternative 3)	162 (27)	654 (109)	194.2
Pulley Ridge South Portion A (Preferred Alternative 4)	162 (27)	654 (109)	93.6

[4] While not included in this list, it was the intent of the Council to prohibit dredge fishing in this new area through Action 7.

The CIOERT study randomly sampled areas both within Pulley Ridge South and in the surrounding areas (Figure 2.1.2). In this study, plate corals (e.g. *Agaricia* spp., *Helioseris cucullata*, *Madracis* spp., and *Oculina diffusa*) were found in high densities outside the boundaries of Pulley Ridge South but mostly within the boundaries of Pulley Ridge North (a small corner to the south is outside of this boundary; see Figure 2.1.1). With this new information, experts and the Gulf of Mexico Fisheries Management Council's (Council) Coral Statistical and Scientific Committee (SSC) and Coral Advisory Panel (AP) proposed that the existing Pulley Ridge South be expanded to include more of the area with newly documented coral (Pulley Ridge South Portion A). This expanded area is dominated by newly settled colonies of plate coral less than 2 inches in diameter. Densities of more than 15 colonies/m^2 were found in the Central Basin Region (Pulley Ridge South Portion A), which is to the west of the existing Pulley Ridge South boundary (Figure 2.1.1 and 2.1.2) and hard bottom was upwards of 88% of the bottom habitat. Twelve scleractinian corals, seven black coral species, and 92 sponge taxa were identified in the Pulley Ridge study. Pulley Ridge South Portion A is also home to substantial algal coverage and is known to have red grouper pits. The Central Basin (in Pulley Ridge South Portion A) (Figure 2.1.2) had a higher percent coral cover than the main ridge in the existing Pulley Ridge South. There has been a dramatic decline in the percent of living coral from 2003 to 2015 on the main ridge of Pulley Ridge South, though reasons for this decline are unknown.

The highest species diversity of fish has been observed on the main ridge of Pulley Ridge South-including the highest densities of red grouper. Fish densities on the main ridge of Pulley Ridge South were nearly four times higher than those observed in Pulley Ridge South Portion A. Areas sampled just off the main reef (within Pulley Ridge South) had fish densities more than twice those of the main ridge. Red grouper pits were found in high densities in Pulley Ridge South Portion A, and lionfish were found throughout the region.

Proposals to modify the boundaries of the existing Pulley Ridge South have been met with contention, as the proposed area in Pulley Ridge South Portion A is an area frequently used by longline fishermen when the seasonal 35-fathom longline closure goes into effect (currently June – August). Vessel monitoring system (VMS) data from vessels with bottom-tending gear were overlaid on the proposed expansion, and there is evidence that this area is used by fishermen (Figure 2.1.3). These VMS data were from the years 2007 until 2015 and more explanation about the data can be found in Section 1.1. Shark Bottom Longline observer data were overlaid on the proposed expansion, and out of 135,926 observed fishing sets from 2008 through 2016, there were two sets by two vessels. Both vessels held commercial reef fish permits and were therefore included in spatial analysis via VMS data. One of the two vessels is no longer active. Recreational and other commercial highly migratory species (HMS) fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish.

A working group was convened in January 2017 to determine if there could be a suitable compromise on the expansion of Pulley Ridge South to extend all its current regulations to an expanded area (i.e., some modification to the proposed boundaries of Pulley Ridge South Portion A). After reviewing information from fishermen and scientists, there were no modifications that could be made to accommodate both groups, given that current fishery participants generally use the area near and adjacent to the existing boundary of Pulley Ridge South.

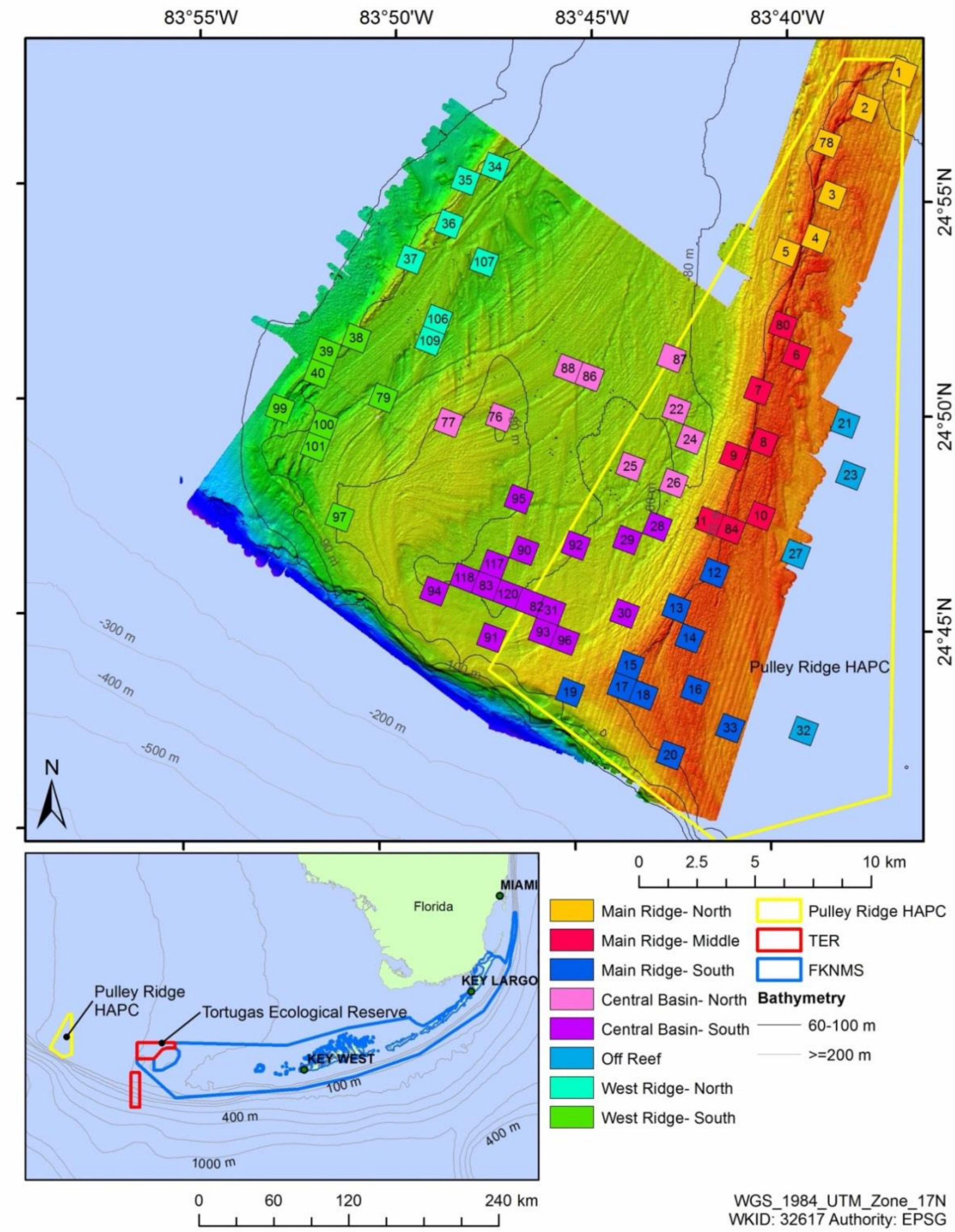

Figure 2.1.2. The random 1 km^2 (approximately 0.5 nm) blocks surveyed with remotely operated vehicles (ROVs) during the CIOERT study (figure from Reed et al. 2017).
*Note: legend and images are labeled Pulley Ridge HAPC, which is equivalent to Pulley Ridge South in this document.

Alternative 1 (No Action) would maintain the existing Pulley Ridge South HAPC regulations and boundaries. The existing larger rectangle of Pulley Ridge North would still be an HAPC with no regulations, and Pulley Ridge South would still have the associated regulations of no bottom-tending gear. This alternative would provide no additional coral protections to areas outside of the existing Pulley Ridge South and would no longer contain the known extent of corals as provided by recent studies.

Alternative 2 would extend the regulations that are currently in place for Pulley Ridge South to the entire rectangle of Pulley Ridge North. This alternative would expand the fishing regulations to a total area of 2302.4 nm^2 (Table 2.1.1) and would include nearly all of Pulley Ridge South Portion A. **Alternative 2** would include areas of Pulley Ridge North that have not been documented to have extensive coral communities. There are several areas within this rectangle that are known to have extensive fishing activity with bottom-tending gear including bottom trawling and bottom longlines.

Alternative 3 is the recommendation of the 2014 Coral Working Group. This would extend the regulations to the west and south of the existing Pulley Ridge South to encompass both Pulley Ridge South and Pulley Ridge South Portion A (Figure 2.1.1) and increase the area with regulations from 100.7 nm^2 to 194.2 nm^2 (Table 2.1.1). **Alternative 3** would affect the bottom longline sector because it extends the Pulley Ridge South fishing regulations to an area that is currently used by bottom longline fishermen.

Preferred Alternative 4 would extend most of the Pulley Ridge South fishing regulations to Pulley Ridge South Portion A (Figure 2.1.1), but would not include a prohibition on bottom longlining in the extended portion. **Preferred Alternative 4** would allow a fishery that has historically used this area to continue to do so, but would include regulations to prevent use of other types of bottom-tending gear including bottom trawling, buoy gear, pots or traps, and prohibit anchoring by fishing vessels.

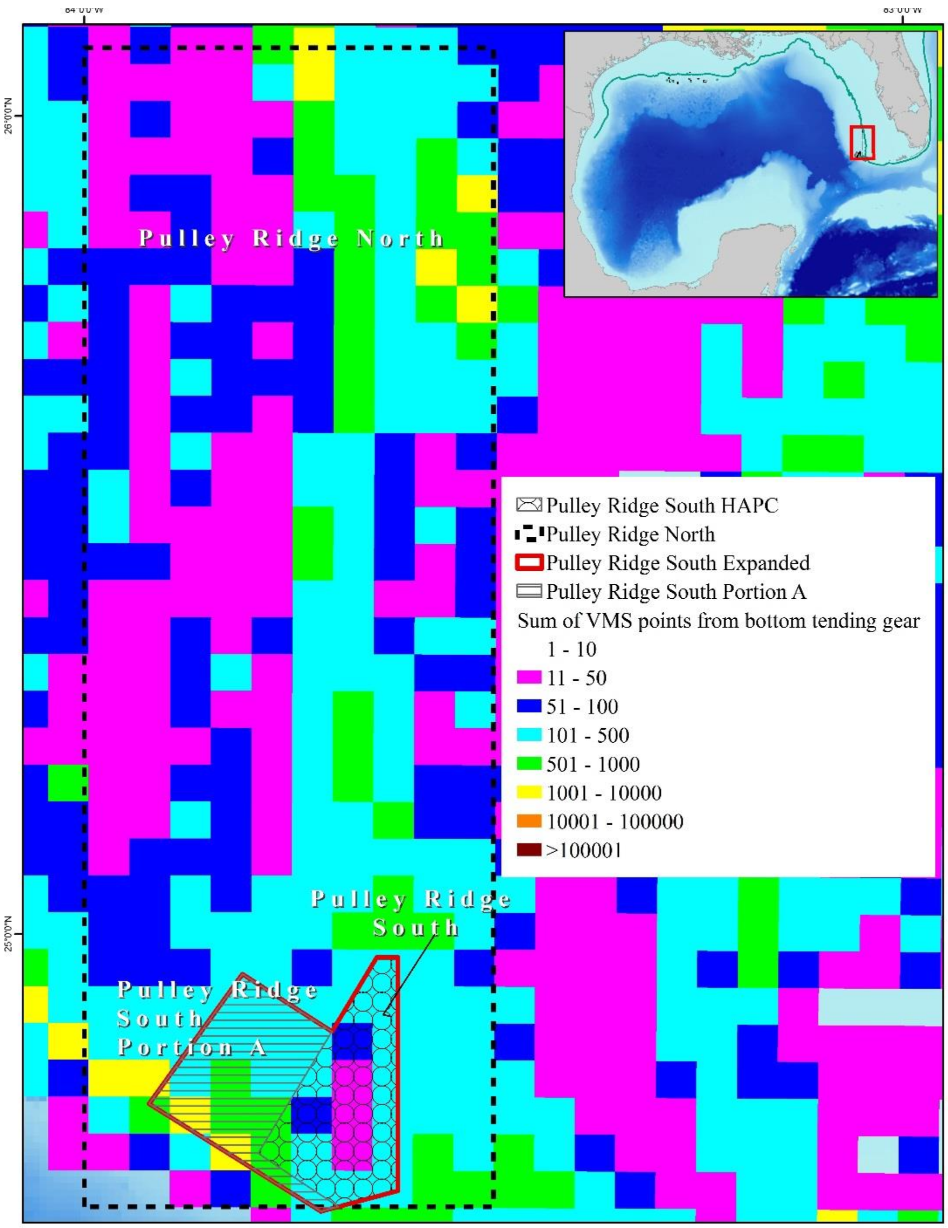

Figure 2.1.3. VMS data overlaid on the existing and proposed expansions of Pulley Ridge. VMS data include all vessels with bottom-tending gear and span the time from March 2007 until July 2015. VMS data are on 2.5 nm by 2.5 nm gridded cells. VMS locations are collected once every hour regardless of fishing activity. These data do not include shrimp electronic logbook (ELB) data. Magenta and dark blue indicate areas with few VMS points.

Alternative 1 would have the least effects on the fishing community as it would maintain the status quo, and not expand the regulated area. However, **Alternative 1** would also not protect habitat or the newly identified stony coral communities from any future fishing effects and would be the least beneficial to the physical, biological, and ecological environments. **Alternative 2** would be the most beneficial to the biological community by preventing physical impacts from fishing gear to the habitat and coral colonies, but the least beneficial to the fishing community, especially during the 35-fathom seasonal closure, because it would prohibit fishing with bottom-tending gear from areas that are currently fished. **Alternative 3** would encompass the newly documented coral habitat which would be more beneficial to the physical, biological, and ecological environments than **Alternatives 1** and **4**, but would be less beneficial to the economic environment than **Preferred Alternative 4** because it would prohibit fishing in a larger area. **Preferred Alternative 4** could be considered a compromise in that it allows fishing that currently occurs to continue, but prevents future effects on the biological and ecological community from other types of bottom-tending gear.

2.2 Action 2 – New Areas for HAPC Status in the Southeastern Gulf

Alternative 1: No Action. Do not establish any HAPCs in the Southeastern Gulf.

Alternative 2: Establish a new HAPC named Long Mound bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Long Mound	A	84°47.955’	26°28.835’
Depth Range:	B	84°45.051’	26°28.790’
984-2298 ft	C	84°45.153’	26°23.562’
(164-383 fathoms)	D	84°48.055’	26°23.607’
Area: 13.6 nm^2	A	84°47.955’	26°28.835’

Option a. Do not establish fishing regulations in the Long Mound HAPC

Option b. Prohibit fishing with bottom-tending gear in the Long Mound HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Alternative 3: Establish a new HAPC named Many Mounds bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Many Mounds	A	84°45.246’	26°13.000’
Depth Range:	B	84°39.559’	26°13.015’
654-2298 ft	C	84°39.611’	26°10.401’
(109-383 fathoms)	D	84°45.435’	26°10.565’
Area: 13.0 nm^2	A	84°45.246’	26°13.000’

Option a. Do not establish fishing regulations in the Many Mounds HAPC

Option b. Prohibit fishing with bottom-tending gear in the Many Mounds HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Alternative 4: Establish a new HAPC named North Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
North Reed	A	84°48.104’	26°20.993’
Depth Range:	B	84°42.302’	26°20.902’
984-2952 ft	C	84°42.354’	26°18.289’
(164-492 fathoms)	D	84°48.154’	26°18.380’
Area: 13.6 nm^2	A	84°48.104’	26°20.993’

Option a. Do not establish fishing regulations in the North Reed HAPC

Option b. Prohibit fishing with bottom-tending gear in the North Reed HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Alternative 5</u>: Establish a new HAPC named West Florida Wall bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
West Florida Wall Depth Range: 1308-1974 ft (218-329 fathoms) Area: 36.3 nm^2	A	84°47.955’	26°28.835’
	B	84°46.754’	26°28.816’
	C	84°42.076’	26°10.471’
	D	84°44.577’	26°10.528’
	E	84°47.986’	26°25.028’
	F	84°47.980’	26°25.100’
	A	84°47.955’	26°28.835’

Option a. Do not establish fishing regulations in the West Florida Wall HAPC

<u>Preferred Option b.</u> Prohibit fishing with bottom-tending gear in the West Florida Wall HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

<u>Discussion:</u>

Since the implementation of Generic EFH Amendment 3 (GMFMC 2005), there have been many new research expeditions that have explored the west Florida shelf. Many have taken remotely operated vehicles (ROV) to explore ridges and mounds that have been previously identified using multi-beam and side-scan sonar remote sensing methods. Long Mound, Many Mounds, North Reed Site, and the West Florida Wall are all on the west Florida shelf in depths of 600-3000 ft (100-500 fathoms) (Table 2.2.1, Figure 2.2.1). These areas were identified as priority areas by the 2014 Coral Working Group. Six research cruises using multi-beam sonar and ROV found hundreds of mounds and ridges on the west Florida shelf over an extensive rocky scarp more than 123.7 nautical miles long (Ross et al. 2017). Shallower mounds and ridges (those less than 1638 ft [273 fathoms]) had stony coral (*L. pertusa*) caps in higher densities than the rocky scarp, but overall, results from these research expeditions indicate that the west Florida shelf may have more deep-water coral coverage that other areas in the Gulf (Ross et al. 2017). In 2017, the NOAA Deep Sea Coral Research and Technology Program (DSCRTP) identified these areas as priorities for research to help facilitate coral management and to provide information to the Gulf of Mexico Fishery Management Council (Council) (Wagner et al. 2017). This research expedition confirmed that, in the proposed areas [in this action], there are extensive deep-water coral banks with *L. pertusa* and numerous fields of *Leiopathes* spp. which is a genus of black coral that is extremely long-lived; in the Gulf of Mexico (Gulf), specimens have been aged to 500 years and older with growth rates of 0.0008 cm/year to 0.0017 cm/year (Prouty et al. 2011). In the 2017 expedition, numerous individuals were identified with bases of at least 1 cm, indicating the individual colonies observed were potentially hundreds to thousands of years old (unpublished data).

VMS data do not indicate that these areas are frequently visited by vessels with bottom-tending gear (Figure 2.2.1). However, there have been observations of golden crab fishing occurring here (Drs. Etnoyer and Brooke, NOAA and Florida State University, pers. comm.) despite regulations that prohibit such fishing activity. Shark Bottom Longline observer data do not show any commercial shark fishing taking place within these proposed areas. Recreational and other commercial HMS fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish.

Table 2.2.1. Sites proposed in Action 2 for Long Mound, Many Mounds, North Reed, and West Florida Wall with the area of each proposed alternative. Minimum and maximum depths are provided.

Site	Minimum depth feet (fathoms)	Maximum depth feet (fathoms)	Area (nm^2)
Long Mound (Preferred Alternative 2)	984 (164)	2298 (383)	13.6
Many Mounds (Preferred Alternative 3)	654 (109)	2298 (383)	13.0
North Reed (Preferred Alternative 4)	984 (164)	2952 (492)	13.6
West Florida Wall (Alternative 5)	1308 (218)	1974 (329)	36.3

Alternative 1 would not create any new HAPCs in the southeastern Gulf, and would not protect additional deep-sea coral areas from the physical effects of bottom-tending gear. Currently, in the eastern Gulf there are three marine reserves, Madison-Swanson, Steamboat Lumps, and the Edges, which were established to protect reef fish. The existing Pulley Ridge North and Pulley Ridge South are HAPCs, but only Pulley Ridge South has regulations in place to protect corals from bottom-tending gear (see discussion on Action 1). To the south, there are the Tortugas Marine Reserves and the Florida Keys National Marine Sanctuary, which both manage and protect areas mostly outside of the Council's jurisdiction.

Alternative 2 would create an HAPC around the area identified as Long Mound. Long Mound contains a series of mounds and ridges that have many stony corals (e.g. *Lophelia pertusa*, *Madrepora oculata*, etc.), black corals (e.g., *Leiopathes* spp.), octocorals and sponges (Brooke 2017). ROVs have been used to survey these areas in 2010 and 2012 (Lophelia II cruises[5]) and 2017 (Wagner et al. 2017). Golden crab and royal red shrimp are closely associated with these deep reefs, though there is little evidence to suggest that royal red shrimping occurs here; electronic logbook (ELB) data do not indicate heavy shrimping effort here (Figure 2.2.1). The DSCRTP database lists two species of stony coral and three species of black coral in this area. **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Option b** is unlikely to affect current bottom-tending gear fisheries and would protect the habitat and corals from damage caused by bottom-tending gear.

[5] http://oceanexplorer.noaa.gov/explorations/explorations.html

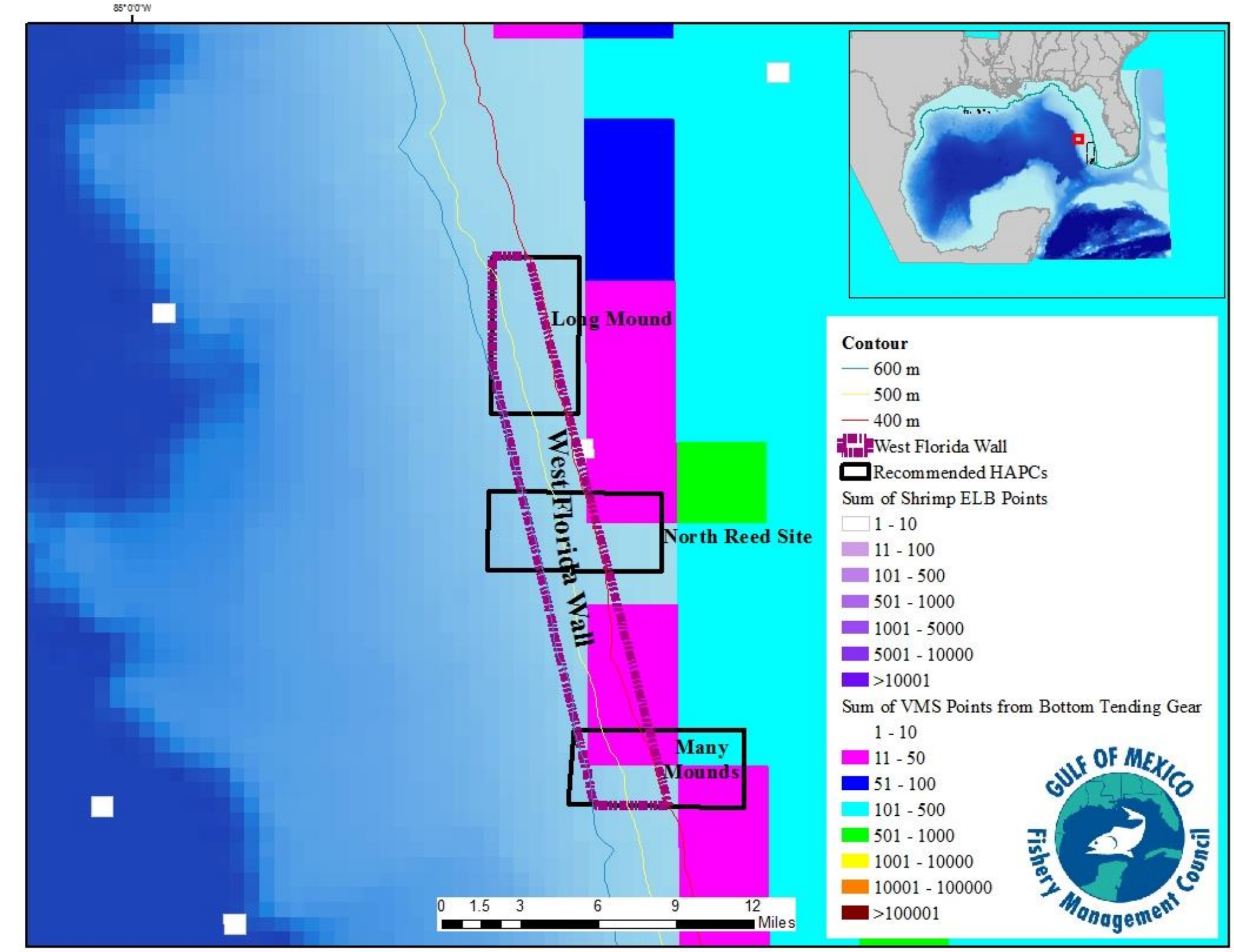

Figure 2.2.1. Fishing data overlaid on the proposed HAPCs Long Mound, North Reed, Many Mounds, and West Florida Wall. VMS data include all vessels with bottom-tending gear and span March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm gridded cells (the larger squares). VMS locations are collected once every hour regardless of fishing activity. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm gridded cells (the smaller squares). ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at the Council's Coral Portal.[6] Magenta and dark blue indicate areas with few VMS pings; any ELB cell that is not white indicates shrimping activity (see description of data used in Section 1.1).

Alternative 3 would create an HAPC in the area identified as Many Mounds. This site has been surveyed more than Long Mounds and North Reed and has a large number of documented mounds which provide vertical relief. This site has a high percentage cover of *L. pertusa*, black corals, octocorals, and sponges. Large numbers of golden crabs have been observed at this site (Brooke 2017). Based on VMS and shrimp ELB information, this area is not currently heavily fished with bottom-tending gear (Figure 2.2.1). The DSCRTP database lists at least four species of stony coral and at least four species of black coral in this area. **Option a** would not impose fishing regulations in this area and would not protect habitat or corals from damage caused by

[6] http://portal.gulfcouncil.org/coralhapc.html.

bottom-tending gear. **Option b** is unlikely to affect current bottom-tending gear fisheries and would protect habitat and corals from damage caused by bottom-tending gear.

Alternative 4 would create an HAPC at the site North Reed. This site is topographically similar to Long Mound with mounds on a deeper slope, and supports an octocoral-dominated community (Brooke 2017). There are also many mounds within this site with high cover of *L. pertusa* and black coral species such as *Leiopathes* spp. (Brooke 2017). Both VMS and shrimp ELB data indicate that this area is not fished with bottom-tending gear (Figure 2.2.1). The DSCRTP database lists at least five species of stony coral and two species of black coral in this area. **Option a** would not impose fishing regulations in this area and would not protect habitat or corals from damage caused by bottom-tending gear. **Option b** is unlikely to affect current bottom-tending gear fisheries and would protect habitat and corals from damage caused by bottom-tending gear.

Preferred Alternative 5 would create an HAPC at the West Florida Wall. This area has been recommended by the SSC and encompasses a continuous wall-like feature in the 1312-1970 ft (218-328 fathoms or 400-600 m) depth range. **Preferred Alternative 5** connects **Alternatives 2**, **3**, and **4**, which all share this feature, but does not extend deeper than 1970 ft (328 fathoms), nor shallower than approximately 1312 ft (218 fathoms). This wall feature encompasses all of the observed biota and corals that are listed in **Alternatives 2**, **3**, and **4**, but is slightly smaller (approximately 3.9 nm^2) than the combined total area of Long Mound, North Reed Site, and Many Mounds. Both VMS and shrimp ELB data do not indicate that this is currently heavily fished with bottom-tending gear (Figure 2.2.1). **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** is unlikely to affect current bottom-tending gear fisheries and would protect the habitat and corals from damage caused by bottom-tending gear in the future.

Alternatives 2-4 are biologically and physically unique areas and it is not reasonable to compare them to each other. When compared to the other alternatives in **Action 2**, **Alternative 1** would have the least effects on the fishing community because it would maintain status quo, and not establish HAPCs. However, **Alternative 1** would also not protect the identified habitat or coral communities from future fishing impacts from bottom-tending gear. **Option a** in **Alternatives 2-4** and **Preferred Alternative 5** would not be different for the biological community than **Alternative 1** because fishing regulations in these areas that are documented to have corals would not be implemented. **Options a** and **b** in **Alternatives 2-4** and **Preferred Alternative 5** are not likely to change how fisheries in the area are prosecuted because there is little to no documented fishing activity with bottom-tending gear in these areas. **Preferred Alternative 5** would likely be more beneficial than **Alternatives 2-4** because it would create a continuous boundary along a feature known to have deep-sea corals, and would also only provide one set of coordinates for boundaries (instead of three separate areas), which is likely to aid law enforcement. **Preferred Alternative 5** would create an HAPC that is 36.3 nm^2, whereas, **Alternatives 2-4** would create three separate HAPCs for a total area of 40.2 nm^2. Additionally, the depth range of **Alternatives 2-4** would be broader from 654-2952 ft (109-492 fathoms); **Preferred Alternative 5** would only be from 1308 – 1974 ft (218-329 fathoms). Similar species compositions are found throughout **Alternatives 2-4** and **Preferred Alternative 5**.

2.3 Action 3 – New Areas for HAPC Status in the Northeastern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northeastern Region

Preferred Alternative 2: Establish a new HAPC named Alabama Alps Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Alabama Alps Reef	A	88°20.525’	29°16.160’
Depth Range:	B	88°18.990’	29°15.427’
162-654 ft	C	88°19.051’	29°13.380’
(27-109 fathoms)	D	88°20.533’	29°14.140’
Area: 2.7 nm^2	A	88°20.525’	29°16.160’

Option a. Do not establish fishing regulations in the Alabama Alps Reef HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the Alabama Alps Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit fishing with the following bottom-tending gear in the Alabama Alps HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 3: Establish a new HAPC named L&W Pinnacles and Scamp Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
L&W Pinnacles	A	87°48.757’	29°18.595’
and Scamp Reef	B	87°50.688’	29°18.484’
Depth Range:	C	87°52.484’	29°19.754’
330-984 ft	D	87°51.449’	29°20.401’
(55-164 fathoms)	E	87°50.933’	29°20.095’
Area: 14.3 nm^2	F	87°46.631’	29°20.832’
	G	87°46.326’	29°21.473’
	H	87°45.535’	29°21.314’
	I	87°43.465’	29°22.518’
	J	87°42.632’	29°21.144’
	K	87°45.525’	29°19.269’
	A	87°48.757’	29°18.595’

Option a. Do not establish fishing regulations in the L&W Pinnacles and Scamp Reef HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the L&W Pinnacles and Scamp Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit fishing with the following bottom-tending gear in the L&W Pinnacles and Scamp Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 4: Establish a new HAPC named Mississippi Canyon 118 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 118 Depth Range: 2622-4920 ft (437-820 fathoms) Area: 11.0 nm^2	A	88°30.789’	28°53.183’
	B	88°27.819’	28°53.216’
	C	88°27.782’	28°50.602’
	D	88°27.759’	28°48.944’
	E	88°30.727’	28°48.962’
	A	88°30.789’	28°53.183’

Option a. Do not establish fishing regulations in the Mississippi Canyon 118 HAPC.

Preferred Option b. Prohibit fishing with bottom-tending gear in the Mississippi Canyon 118 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 5: Establish a new HAPC named Roughtongue Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Roughtongue Reef Depth Range: 162-654 ft (27-109 fathoms) Area: 13.6 nm^2	A	87°37.527’	29°27.596’
	B	87°31.552’	29°27.621’
	C	87°31.539’	29°25.007’
	D	87°37.510’	29°24.981’
	A	87°37.527’	29°27.596’

Option a. Do not establish fishing regulations in the Roughtongue Reef HAPC.

Preferred Option b. Prohibit fishing with bottom-tending gear in the Roughtongue Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Option c. Prohibit fishing with the following bottom-tending gear in the Roughtongue Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 6: Establish a new HAPC named Viosca Knoll 826 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 826 Depth Range: 1638-2952 ft (273-492 fathoms) Area: 10.3 nm^2	A	88°03.509’	29°10.920’
	B	87°59.460’	29°10.877’
	C	87°59.448’	29°07.974’
	D	88°03.532’	29°08.017’
	A	88°03.509’	29°10.920’

Option a. Do not establish fishing regulations in the Viosca Knoll 826 HAPC.

Preferred Option b. Prohibit fishing with bottom-tending gear in the Viosca Knoll 826 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Alternative 7</u>: Establish a new HAPC named Viosca Knoll 862/906 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 862/906 Depth Range: 984-2298 ft (164-383 fathoms) Area: 18.8 nm^2	A	88°23.608'	29°07.640'
	B	88°20.590'	29°07.603'
	C	88°20.554'	29°03.749'
	D	88°22.016'	29°03.734'
	E	88°21.998'	29°02.367'
	F	88°24.972'	29°02.281'
	G	88°25.044'	29°07.568'
	H	88°25.044'	29°07.592'
	I	88°25.045'	29°07.676'
	A	88°23.608'	29°07.640'

Option a. Do not establish fishing regulations in the Viosca Knoll 862/906 HAPC.

Option b. Prohibit fishing with bottom-tending gear in the Viosca Knoll 862/906 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Option c</u>. Prohibit fishing with bottom-tending gear in the Viosca Knoll 862/906 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels. Provide an exemption to the prohibition on fishing with bottom-tending gear for fishermen that possess a royal red shrimp endorsement and are fishing with royal red shrimp fishing gear.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

<u>Discussion:</u>

Hard bottom in the northeastern Gulf is comprised of drowned fossil reefs, scattered hardgrounds, and an area that is commonly referred to as "the Pinnacles" (Brooke 2017); sites in this action are primarily off the coast of Mississippi and Alabama (Figure 2.3.1). In the Pinnacles, there are patch reefs, high pinnacle-type reefs, and large, flat-topped summits that can have vertical relief up to 65.4 ft (Gittings et al. 1992). The Pinnacles have increasing species richness in coral taxa from west to east, likely due to the increase in nutrients available from the Mississippi River (Gittings et al. 1992; Mienis et al. 2012). Other taxa with high species richness are sponges and fishes (Gittings et al. 1992; Weaver et al. 2002). One important division off the coast of Alabama is the DeSoto Canyon, which divides the Gulf into two parts: a riverine sediment regime to the west and carbonate sediments to the east (Brooke 2017).

There is substantial fishing in this area by bandit gear fishermen and shrimpers, and a low level of fishing with bottom longlines (Figure 2.3.1 and 2.3.2). In this region, there are deep-drop recreational fishers as well (Brooke 2017). In an effort to accommodate existing fishing practices, the size of these areas and borders were slightly modified at the joint meeting of the Shrimp AP, Coral AP, and Coral SSC in 2016. Site depths range from 162 to 4,920 ft (27 to 820 fathoms), and the area of each site is between 2.7 nm^2 and 18.8 nm^2 (Table 2.3.1). Thus, none of the alternatives are likely to affect commercial shrimping except in the Viosca Knoll 862/906 site (**Preferred Alternative 7**). Shark Bottom Longline observer data from vessels with commercial shark directed or incidental permits were overlaid on the proposed areas. Out of 135,926 observed fishing sets from 2008 through 2016, only one set in Alabama Alps (by a vessel that is no longer active) and two sets by one vessel in the L&W Pinnacles and Scamp Reef areas were observed. Both vessels held commercial reef fish permits and are, therefore, included in spatial analysis via VMS data. Recreational and other commercial HMS fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish.

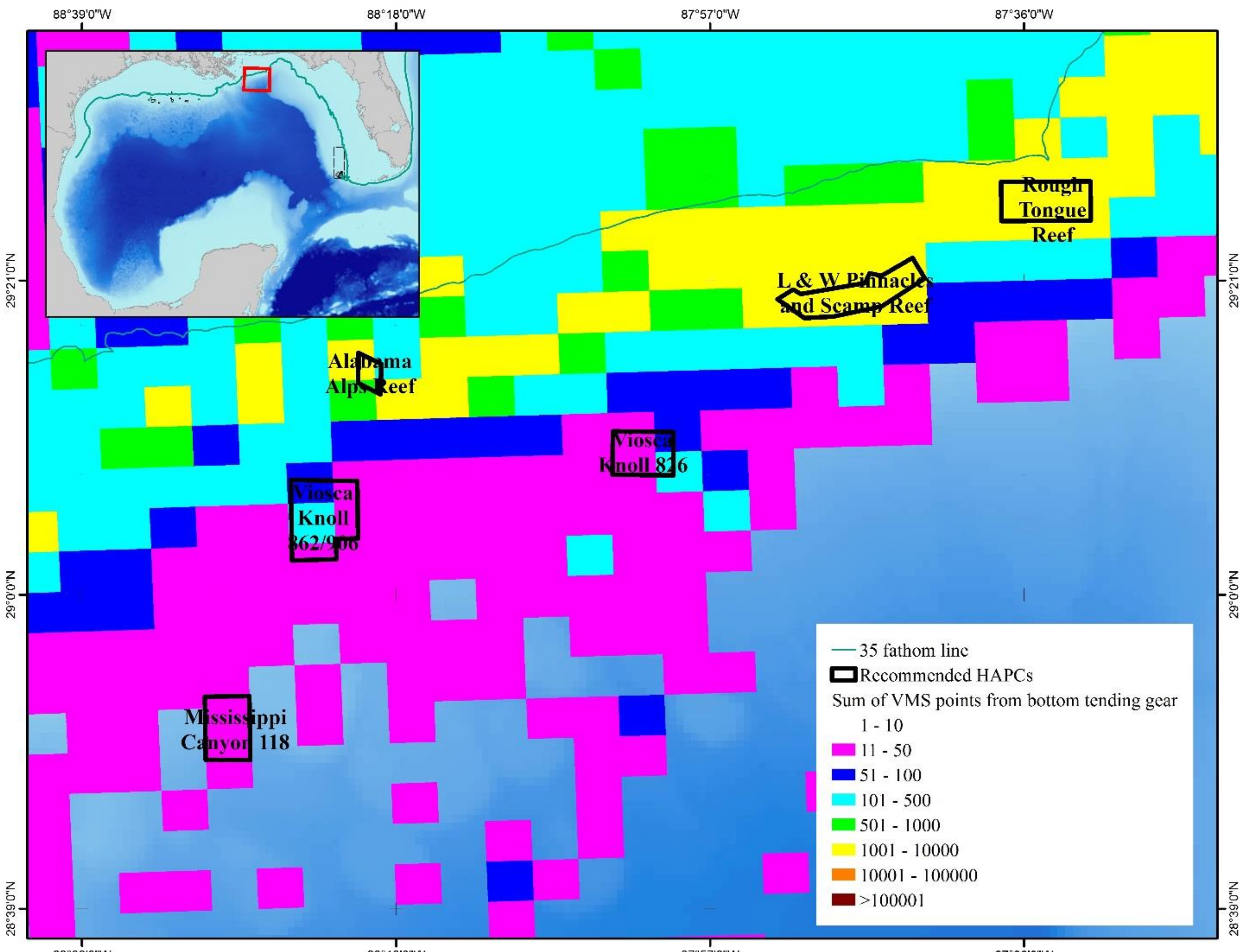

Figure 2.3.1. VMS data overlaid on the proposed HAPCs Mississippi Canyon 118, Viosca Knoll 862/906, Alabama Alps Reef, Viosca Knoll 826, L&W Pinnacles and Scamp Reef, and Roughtongue Reef. VMS data include all vessels with bottom-tending gear and span the time from March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm gridded cells. VMS locations are collected once every hour regardless of fishing activity. Magenta and dark blue indicate areas with few VMS points.

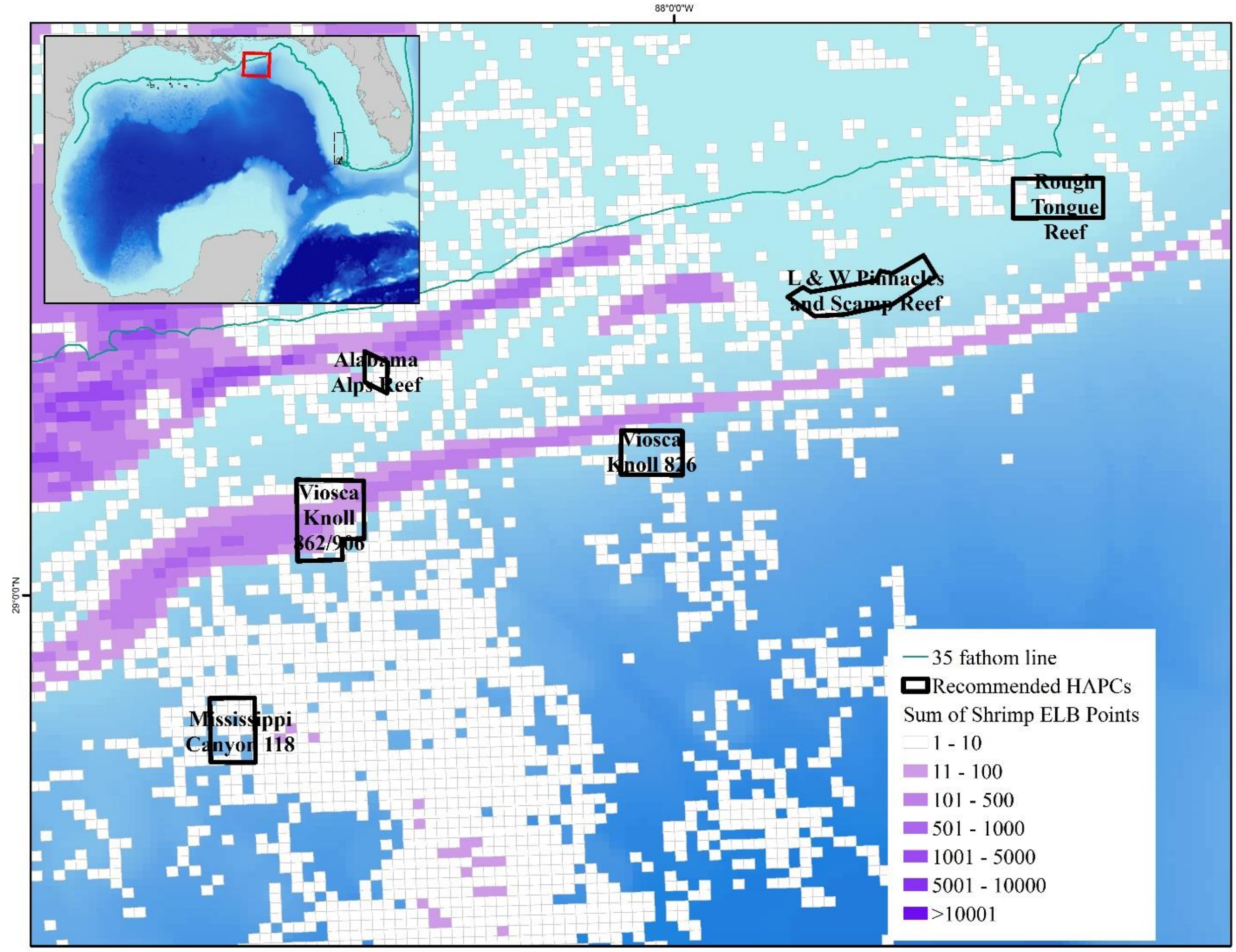

Figure 2.3.2. ELB data overlaid on the proposed HAPCs Mississippi Canyon 118, Viosca Knoll 862/906, Alabama Alps Reef, Viosca Knoll 826, L&W Pinnacles and Scamp Reef, and Roughtongue Reef. These data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm gridded cells. ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at the Council's Coral Portal.[7] Any ELB cell that is not white indicates shrimping activity (see description of data used in Section 1.1).

[7] http://portal.gulfcouncil.org/coralhapc.html

Table 2.3.1. Sites proposed in Action 3 for the northeastern HAPCs with the area of each proposed alternative. Minimum and maximum depths in feet and fathoms are provided.

Site	Minimum depth ft (fathoms)	Maximum depth ft (fathoms)	Area (nm^2)
Alabama Alps (Preferred Alternative 2)	162 (27)	654 (109)	2.7
L & W Pinnacles and Scamp Reef (Preferred Alternative 3)	330 (55)	984 (164)	14.3
Mississippi Canyon 118 (Preferred Alternative 4)	2622 (437)	4920 (820)	11.0
Roughtongue Reef (Preferred Alternative 5)	162 (27)	654 (109)	13.6
Viosca Knoll 826 (Preferred Alternative 6)	1638 (273)	2952 (492)	10.3
Viosca Knoll 862/906 (Preferred Alternative 7)	984 (164)	2298 (383)	18.8

Alternative 1 would not create any new HAPCs in the northeastern Gulf. There are currently no other HAPCs in this region. This alternative would provide no additional coral protections to the northeastern Gulf via HAPC designation with fishing regulations.

Preferred Alternative 2 would create an HAPC at the site named Alabama Alps. Since the recommendation from the Coral Working Group in 2014, the boundaries of this feature have been modified to better surround the topographic feature while minimizing impacts to the shrimp fishery (using ELB data) (Figure 2.3.2). Alabama Alps is heavily fished by fishing vessels with VMS (Figure 2.3.1). Further analysis indicates that over 80% of the activity from VMS data are from vessels with bandit gear (vertical line fishing); thus, only the anchoring prohibition would be likely to affect the fishermen using this area, as fishermen typically anchor when using bandit gear. Six species of black coral, 10 species of stony coral, and numerous octocoral species have been documented in this area**. Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear which includes anchoring. **Preferred Option b** would prevent bottom-tending gear from damaging corals at this site, but could affect fishermen using bandit gear by preventing bottom anchoring. **Option c** would allow bottom anchoring by fishing vessels, thereby allowing anchoring from fishermen using bandit rigs, but prohibit all other bottom-tending gear from fishing vessels.

Preferred Alternative 3 would create an HAPC at L&W Pinnacles and Scamp Reef. This area was originally mapped in 1957 and has steep pinnacles that are colonized by black cup corals and stony corals (Brooke 2017). Other low-relief features within this site have black corals and octocorals (Gittings et al. 1992). Scamp reef was named for its abundance of scamp grouper observed on the feature (Brooke 2017). The DSCRTP database documents 13 species of stony coral and three species of black coral in this area. Though there is little evidence of shrimping in this region (Figure 2.3.2), there is a high occurrence of VMS points within this proposed area (Figure 2.3.1). When the VMS data were further analyzed for gear type used, more than 86% of the VMS points were from bandit gear. **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** could affect fishermen using bandit gear by preventing bottom anchoring. **Preferred Option b** would prevent bottom-tending gear from damaging or causing mortality to corals at this site. **Option c** would allow bottom anchoring by fishing vessels, easing the accessibility of the site to vessels using bandit rigs, but prohibit all other bottom-tending gear from fishing vessels.

Preferred Alternative 4 would create an HAPC at Mississippi Canyon 118. There are no documented stony or black corals in the DSCRTP database but other reports have indicated there are thickets of the stony coral *Madrepora oculata* housing red crabs. VMS and Shrimp ELB data do not indicate that this is a heavily fished area (Figure 2.3.1 and 2.3.2). **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from bottom-tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit fishing with bottom-tending gear from damaging the corals in this area in the future.

Preferred Alternative 5 would create an HAPC at Roughtongue Reef. Roughtongue Reef is a steep feature that is also known to fishermen as 40-fathom fishing ground or Easter Delta Mounds (CSA and TAMU 2001; Brooke 2017). Steep regions are dominated by black cup coral and stony corals. Other invertebrate assemblages include sponges, octocorals, and echinoderms. High numbers of roughtongue bass observed at this location are what provided this area its name (Brooke 2017). The DSCRTP database documents eight species of stony coral and six species of black coral in this area. Though there is little evidence for shrimping in this region (Figure 2.3.2), there is a high occurrence of VMS points within this proposed area. (Figure 2.3.1). Over 85% of the VMS points are from vessels using bandit gear. **Option a** would not impose fishing regulations in this area and would not protect habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** could affect fishermen using bandit gear by preventing bottom anchoring. **Preferred Option b** would prevent bottom-tending gear from damaging or causing mortality to corals at this site. **Option c** would allow bottom anchoring by fishing vessels, thereby easing the accessibility of the area to vessels using bandit rigs, but prohibit all other bottom-tending gear from fishing vessels.

Preferred Alternative 6 would create an HAPC at Viosca Knoll 826. Viosca Knoll 826 is perhaps the most extensive and well-known deep-water reef documented in the Gulf (Brooke and Schroeder 2007). The mounds have colonies of coral up to 3 ft in diameter with dense black and stony coral colonies on other portions of the knoll (Brooke 2017). This site also contains an active cold seep. Five species of black coral and three species of stony coral have been documented from this region, as have ten species of octocoral. Fish species include: blackbelly rosefish, hakes, conger eels, and alfonsinos (Brooke 2017). There is minimal fishing effort in this region, and most of the location points from the VMS data are from vessels using bandit gear (Figure 2.3.1 and 2.3.2). **Option a** would not impose fishing regulations in this area and would not protect habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit fishing with bottom-tending gear from damaging habitat and corals in this area in the future.

Preferred Alternative 7 would create an HAPC at Viosca Knoll 862/906. Viosca Knoll 862/906 has thickets of black corals and the stony coral, *Lophelia pertusa*. There are several bioherms (i.e. carbonate structures formed by living organisms) that are on the east of the canyon, and on soft substrates between the exposed carbonates there are large numbers of bamboo coral (*Acanella* sp.) (Brooke 2017). Mounds at the south of the canyon have some of the densest live coral documented in the Gulf (Brooke 2017) with high fish densities (Brooks et al. 2016). Fish species that have been documented at Viosca Knoll 862/906 include: snowy grouper, barrelfish, conger eels, blackbelly rosefish, roughies, alfonsinos, and tinselfish (Brooke and Schroeder 2007; Brooks et al. 2016; Brooke 2017). At least four species of black coral, two species of stony coral, and nine octocoral species have been documented in this area.

Viosca Knoll 862/906 is a well-studied deep-water reef in the Gulf. It is also an area that is commonly used to fish for royal red shrimp. Based on personal communications with shrimp fishermen who fish in this area, trawling is not occurring on the actual reef, but to the west on the soft bottom area around it. Nets are retrieved from the bottom before reaching the reef area, but it takes up to a few miles of continuous forward movement to lift the nets up in the water column to the vessel; instead the fishermen lift nets up off the bottom and may set the nets back down once they are away from the reef. Thus, if the boundaries of this area are set to those recommended by the 2014 Coral Working Group, royal red shrimp fishermen would have to begin net retrieval miles from the boundary to have all nets on board by the time that the proposed boundary is crossed. This would essentially eliminate these prime shrimping grounds, as it is evident from ELB data points that the royal red shrimp fishermen use a narrow swath of bottom in this region. As such, the Coral SSC and AP in 2015 recommended that there be an exemption for fishermen prosecuting this fishery. **Option a** would not impose fishing regulations on this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Option b** would affect royal red shrimpers and limit their ability to prosecute their fishery in an effective and efficient manner. **Option b** would also prohibit any bottom-tending fishing gear from damaging the habitat or corals in this area. **Preferred Option c** would allow a fishery that has historically used this area to continue to do so, but would include regulations to prevent use of other types of bottom-tending gear including bottom longlines, buoy gear, pots or traps, and dredges, and prohibit anchoring by fishing vessels. It should be noted that the intent of this exemption is to allow royal red shrimpers to keep nets in the water within the boundaries of the Viosca Knoll 862/906 HAPC, not to have fishing gear contacting the coral. Because of the depths at which the gear is used it was not possible to draw a boundary that allows the shrimpers to have their nets on deck prior to entering into the HAPC and still be able to effectively fish for royal red shrimp.

Currently, a federal commercial Gulf shrimp moratorium permit (federal shrimp permit) is required to commercially shrimp in the Gulf. To fish for royal red shrimp, a royal red shrimp endorsement is required in addition to the federal shrimp permit. Anyone with a federal shrimp permit is eligible for a royal red shrimp endorsement, and the gear set up for royal red shrimp is essentially the same as that used in shallow waters, with the exception of the length of cable. Royal red shrimpers need to have at least ¾ mile (3960 ft) of cable on a winch to be able to reach the bottom (J. Nelson, royal red shrimper, pers. comm.). It is not feasible to have a gear requirement attached to the royal red endorsement for exemption in this area, as there is no easily identifiable gear marking for royal red shrimp fishing. Therefore, there is potential for the royal red fishery to expand within the confines of the shrimp fishery, but the fishermen must possess both a royal red shrimp endorsement and a federal commercial Gulf shrimp moratorium permit. The federal commercial Gulf shrimp moratorium permit is a limited access permit – one must either already possess or purchase a permit from an existing permit holder as no new permits will be distributed be NMFS until either the end of the permit moratorium (August 2026), the Council takes action to lift the moratorium, or the Council takes action to make permits available via some other means.

Alternatives 2-7 are all unique areas and it is not reasonable to compare them to each other. When compared to the other alternatives in **Action 3**, **Alternative 1** would have the least effects on the fishing community because it would maintain status quo, and not establish HAPCs. However, **Alternative 1** would also not protect the identified habitat or coral communities from future fishing effects. **Preferred Alternatives 2-7** would identify areas in the Gulf as HAPCs and this will be beneficial because there are no other HAPCs in this areas. **Option a** in **Preferred Alternatives 2-7** is similar to **Alternative 1** for both the physical and biological/ecological, and economic environment because it would not prohibit fishing with bottom-tending gear in these areas. **Option b** in **Preferred Alternatives 2-7** would be the most beneficial to the physical and biological/ecological environments, but the least beneficial to the economic environment because it would prohibit fishing with bottom-tending gear from areas that are currently fished. It should be noted that **Option b** is the preferred option for **Preferred Alternatives 2**, **3**, **4**, **5**, and **6**. **Option c** in **Preferred Alternatives 2**, **3**, **5**, and **7** could be considered a compromise by allowing fishing activity that has been present to continue, while preventing future effects on the physical and biological/ecological environments from other types of bottom-tending gear. **Option c** is the preferred option for **Preferred Alternative 7**. Overall, **Preferred Alternatives 2-7** would prohibit fishing with some bottom-tending gear types in an additional 70.7 nm^2 in depths from 162 to 4,920 ft (27 to 820 fathoms) (Table 2.3.1), thus protecting the identified coral communities in these areas, but would affect fishing activities. All areas have black and stony corals, though individually observed species and densities may vary as do associated fishes and invertebrates.

2.4 Action 4 – New Areas for HAPC Status in the Northwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named AT 047 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 047 Depth Range: 2622-4920 ft (437-820 fathoms) Area: 6.8 nm^2	A	89°49.404’	27°54.426’
	B	89°46.464’	27°54.486’
	C	89°46.397’	27°51.874’
	D	89°49.336’	27°51.814’
	A	89°49.404’	27°54.426’

Option a. Do not establish regulations in the AT 047 HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the AT 047 Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named AT 357 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 357 Depth Range: 3282-4920 ft (547-820 fathoms) Area: 6.8 nm^2	A	89°43.068’	27°36.259’
	B	89°40.136’	27°36.315’
	C	89°40.073’	27°33.703’
	D	89°43.004’	27°33.646’
	A	89°43.068’	27°36.259’

Option a. Do not establish regulations in the AT 357 HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the AT 357 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 4: Establish a new HAPC named Green Canyon 852 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 852 Depth Range: 4920-6564 ft (820-1094 fathoms) Area: 3.8 nm^2	A	91°08.929’	27°08.354’
	B	91°08.963’	27°05.740’
	C	91°10.610’	27°05.762’
	D	91°10.567’	27°08.376’
	A	91°08.929’	27°08.354’

Option a. Do not establish regulations in the Green Canyon 852 HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the Green Canyon 852 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear. Shark Bottom Longline observer data do not show any commercial shark fishing taking place within these proposed areas. Recreational and other commercial HMS fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish.

Discussion:

The northwestern Gulf generally has two bottom habitat types: hard bottom features, which are usually salt domes capped with carbonate, and shallow banks with high sediments and turbidity (Brooke 2017). All alternatives in this action have areas named after the coinciding lease block area. These areas are in deep-water, and two of the proposed alternatives are in depths more than 3,000 ft (500 fathoms) (Table 2.4.1).

Table 2.4.1. Sites proposed in Action 4 for the proposed HAPCs AT 047, AT 357, and Green Canyon 852 with the area of each proposed alternative. Minimum and maximum depths in fathoms are provided.

Site	Minimum depth ft (fathoms)	Maximum depth ft (fathoms)	Area (nm^2)
AT 047 (Preferred Alternative 2)	2,622 (437)	4,920 (820)	6.8
AT 357 (Preferred Alternative 3)	3,282 (547)	4,920 (820)	6.8
Green Canyon 852 (Preferred Alternative 4)	4,920 (820)	6,564 (1094)	3.8

Alternative 1 would not establish new HAPCs in the northwestern Gulf. Currently, in the northwestern Gulf there are six HAPCs. Only McGrail Bank has fishing regulations associated with it. The HAPC specific fishing regulations for McGrail Bank are as follows: fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring from fishing vessels are prohibited year round (CFR §622.74). McGrail Bank, is at least 80 nm from the proposed sites in Action 4.

Preferred Alternative 2 would create an HAPC in the area that has been identified as AT 047. This area has many mounds and depressions and is an active cold seep (Brooke 2017). There are several colonies of the stony coral *Madrepora oculata* and numerous octocoral colonies. *Chaceon* spp. (golden and red deep-sea crabs) have been observed in conjunction with the octocorals. There is little evidence of fishing with bottom-tending gear in this area (Figure 2.4.1). **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit fishing with bottom-tending gear from damaging or causing mortality to corals in this area in the future.

Preferred Alternative 3 would create an HAPC in the area identified as AT 357. This site was discovered after the *Deep-water Horizon* MC252 oil spill (Brooks et al. 2016) and consists primarily of pavement. This site has a unique invertebrate assemblage compared to other deep-water sites explored in the Gulf. The DSCRTP database lists numerous *Paramuricea* sp. octocoral colonies, the stony coral *Madrepora oculata*, and the black coral *Bathypathes* sp. in this area. Other species of octocorals have also been reported (Brooks et al. 2016). Neither VMS nor shrimp ELB data indicate that this is currently an area heavily fished with bottom-tending gear (Figure 2.4.1). **Option a** would not impose fishing regulations on this area and would not protect corals from damage or mortality caused by bottom-tending gear. **Preferred Option b** would be unlikely to affect current fishing practices and would prohibit fishing with bottom-tending gear from damaging the habitat or corals in this area in the future.

Preferred Alternative 4 would create an HAPC in the area identified at Green Canyon 852. This site has a broad ridge that is densely colonized by corals of different species than those found at shallower sites (Brooks et al. 2016). The range of coral taxa (octocoral, black coral, and stony coral) contribute to a high species diversity. This is the only site that has documented precious coral, or coral that is harvested elsewhere for the jewelry trade. Precious corals typically grow slowly compared to other species and are extremely vulnerable to impacts and degradation. Green Canyon 852 has three species of stony coral, one species of black coral, and several different octocoral species associated with this bank. There is no evidence that fishing occurs in this area. **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** would prevent fishing from expanding into this area and would protect the habitat and corals by prohibiting bottom-tending gear from fishing the area in the future.

Alternatives 2-4 are all unique areas and it is not reasonable to compare them to each other. When compared to the other alternatives in **Action 4**, **Alternative 1** would have the least effects on the fishing community because it would maintain status quo, and not establish HAPCs. However, **Alternative 1** would also not protect the identified coral communities from future fishing effects. **Preferred Alternatives 2-4** would identify areas in the Gulf as HAPCs and this would be beneficial to the physical and biological/ecological environment because it would increase the number of HAPCs, thus potentially protecting the bottom habitat from bottom-tending fishing gear in this area. **Option a** in **Preferred Alternatives 2-4** is similar to **Alternative 1** for the physical and biological/ecological environments and economic environment because it would not prohibit fishing with bottom-tending gear in these areas. **Preferred Option b** in **Preferred Alternatives 2-4** would be the most beneficial to the physical and biological/ecological environments, but the least beneficial to the fishing community because it would prevent bottom-tending gear from fishing in areas that are not currently fished, thus preventing bottom-tending gear fisheries from expanding into these areas. Overall, **Preferred Alternatives 2-4** would prohibit fishing with some bottom-tending gear types in an additional 17.4 nm^2 in depths from 2,622 to 6,564 ft (437 to 1,094 fathoms) (Table 2.4.1), thus protecting the identified coral communities in these areas, but would affect fishing activities in that 17.4 nm^2. All areas have black and stony corals, though individually observed species and densities may vary as do associated fishes and invertebrates.

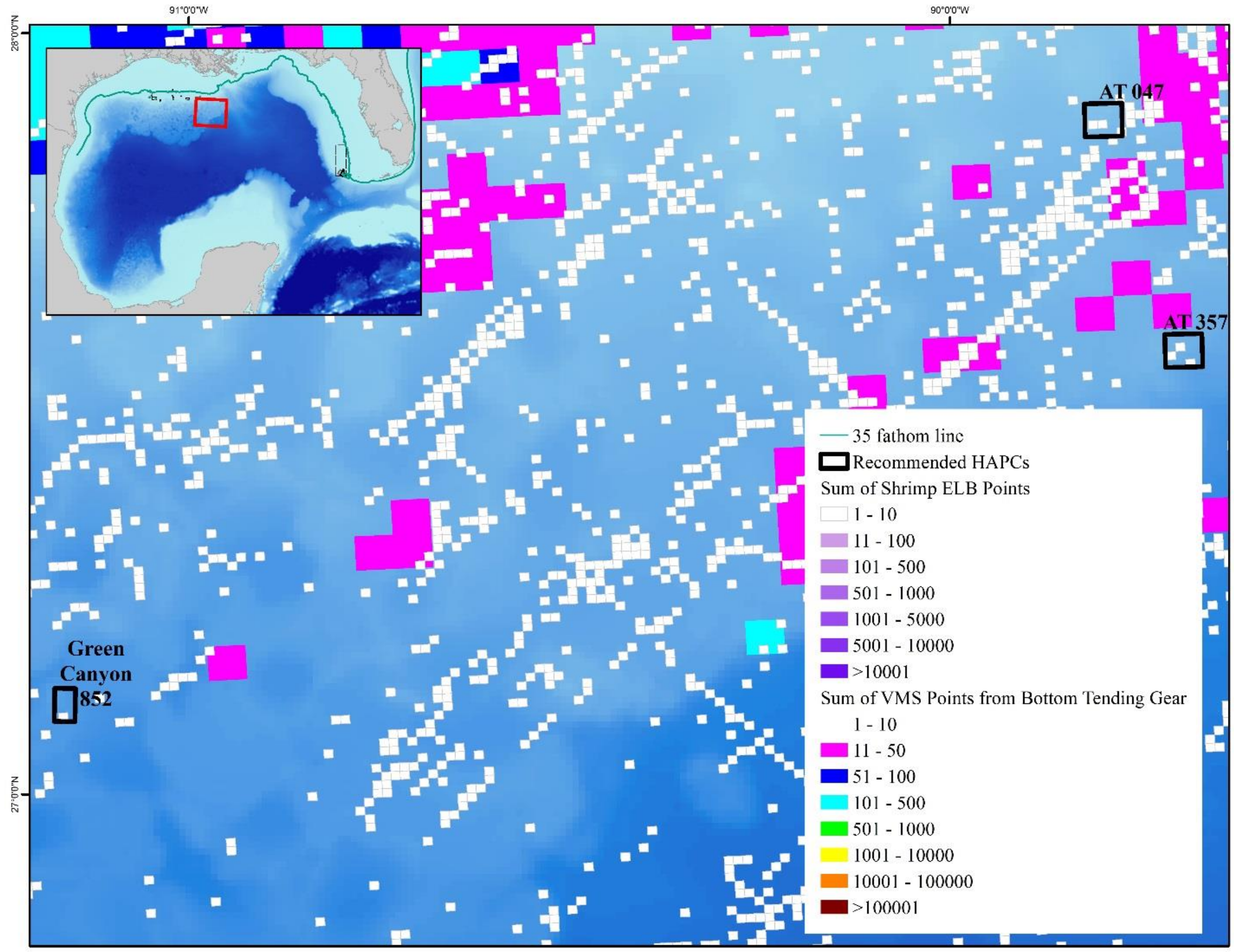

Figure 2.4.1. Fishing data overlaid on the proposed HAPCs AT 047, AT 357, and Green Canyon 852. VMS data include all vessels with bottom-tending gear and span March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm gridded cells (the larger squares). VMS locations are collected once every hour regardless of fishing activity. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm gridded cells (the smaller squares). ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at the Council's Coral Portal.[8] Magenta and dark blue indicate areas with few VMS points; any ELB cell that is not white indicates shrimping activity (see description of data used in Section 1.1).

[8] http://portal.gulfcouncil.org/coralhapc.html

2.5 Action 5 – New Areas for HAPC Status in the Southwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Southwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named Harte Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Harte Bank	A	96°36.590'	26°40.826'
Depth Range:	B	96°32.220'	26°40.789'
162-492 ft	C	96°32.308'	26°37.992'
(27-82 fathoms)	D	96°36.636'	26°38.043'
Area: 10.8 nm^2	A	96°36.590'	26°40.826'

Option a. Do not establish fishing regulations in the Harte Bank HAPC.

Preferred Option b. Prohibit fishing with bottom-tending gear in the Harte Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named Southern Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Southern Bank	A	96°31.902'	27°26.923'
Depth Range:	B	96°30.881'	27°26.989'
162-330 ft	C	96°31.134'	27°25.958'
(27-55 fathoms)	D	96°31.892'	27°25.958'
Area: 0.8 nm^2	A	96°31.902'	27°26.923'

Option a. Do not establish fishing regulations in the Southern Bank HAPC.

Preferred Option b. Prohibit fishing with bottom-tending gear in the Southern Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

Discussion:

Banks along the Texas shelf were identified by researchers at the Coral Working Group in 2014 as warranting HAPC consideration and are commonly referred to in the literature as "South Texas Banks." The continental shelf off Texas is largely a flat shelf with a few hard banks that have been historically well-known (Nash et al. 2013). This reef chain has been described as providing biotic stepping stones for organisms migrating from the southern Gulf to the northern Gulf (Tunnell et al. 2007). These reefs are relict features from the Pleistocene Epoch (i.e. the last ice age). Since 2006, there have been at least four research cruises that have mapped and surveyed these features using ROVs and collection tools. The two proposed alternatives are in depths of 162 to 492 ft (27 to 82 fathoms) and range in area of 0.8 nm^2 to 10.8 nm^2 (Table 2.5.1). Fishing with bottom-tending gear in the two sites is relatively low (Figure 2.5.1 and 2.5.2) though there is evidence of fishing vessels with VMS within the Harte Bank boundaries (Figure 2.5.1). Shark Bottom Longline observer data do not show any commercial shark fishing taking place within these proposed areas. Recreational and other commercial HMS fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish.

Table 2.5.1. Sites proposed in Action 5 for the proposed HAPCs Harte Bank and Southern Bank with the area of each proposed alternative. Minimum and maximum depths in feet and fathoms are provided.

Site	Minimum depth ft (fathoms)	Maximum depth ft (fathoms)	Area (nm^2)
Harte Bank (Preferred Alternative 2)	162 (27)	492 (82)	10.8
Southern Bank (Preferred Alternative 3)	162 (27)	330 (55)	0.8

Alternative 1 would not create any new HAPCs in the southwest region and would maintain the status quo. Currently, in the southwestern Gulf there are seven HAPCs. Of these, three have fishing regulations associated with them (East and West Flower Garden Banks and Stetson Bank). The three HAPCs with regulations are part of the Flower Garden Banks National Marine Sanctuary (FGBNMS). The FGBNMS does not allow fishing except by hook-and-line (this includes bandit gear) and does not allow any anchoring. The HAPC specific regulations for East and West Flower Garden Banks and Stetson Bank are as follows: fishing with bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring from fishing vessels are prohibited year round; East and West Flower Garden Banks also prohibit the use of dredges (CFR §622.74). This alternative would be the least protective alternative for deep-sea corals.

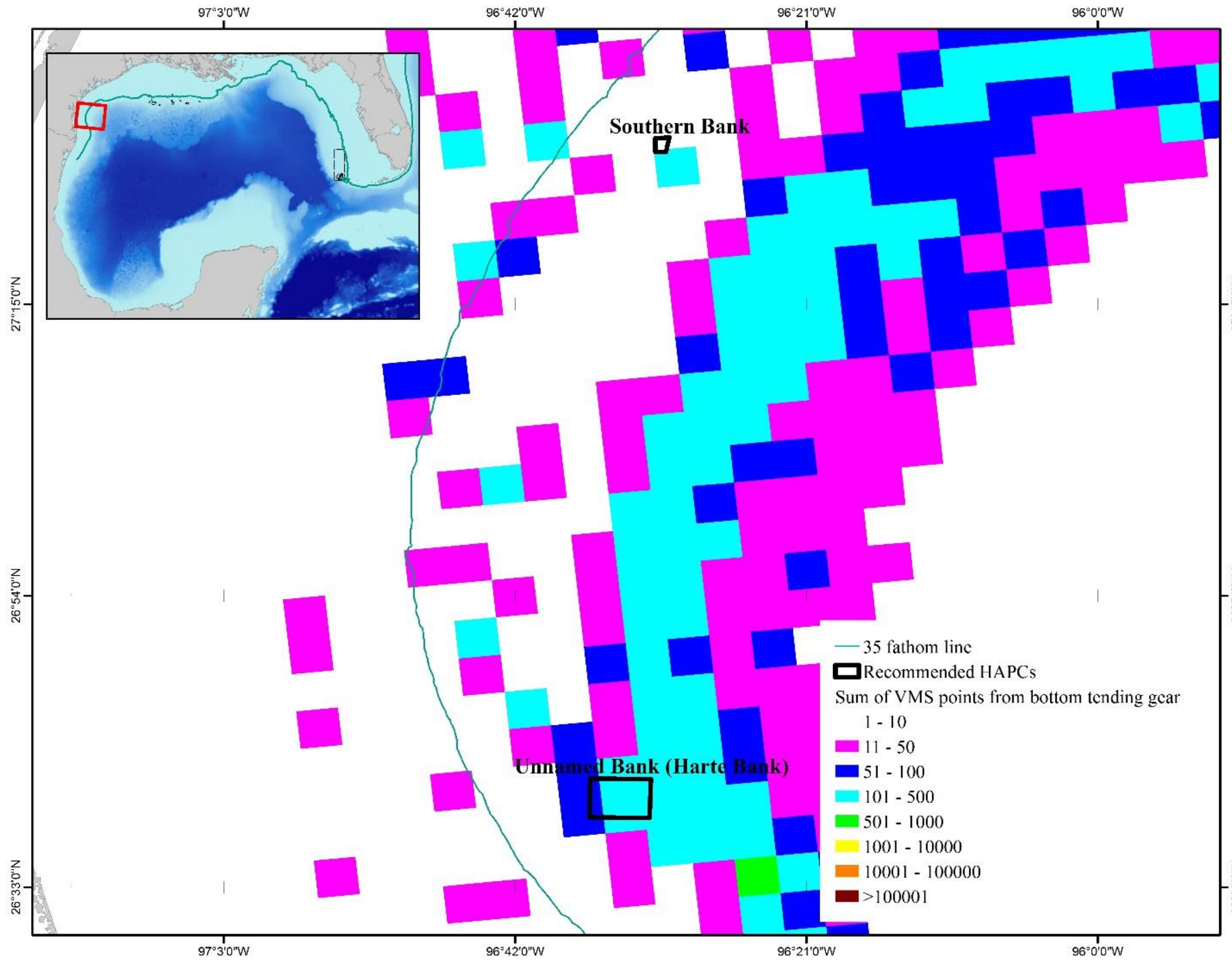

Figure 2.5.1. VMS data overlaid on the proposed HAPCs Harte Bank and Southern Bank. Magenta and dark blue indicate areas with few VMS pings. VMS data include all vessels with bottom-tending gear and span the time from March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm gridded cells. VMS locations are collected once every hour regardless of fishing activity. Interactive maps and data are provided at the Council's Coral Portal.[9]

[9] http://portal.gulfcouncil.org/coralhapc.html.

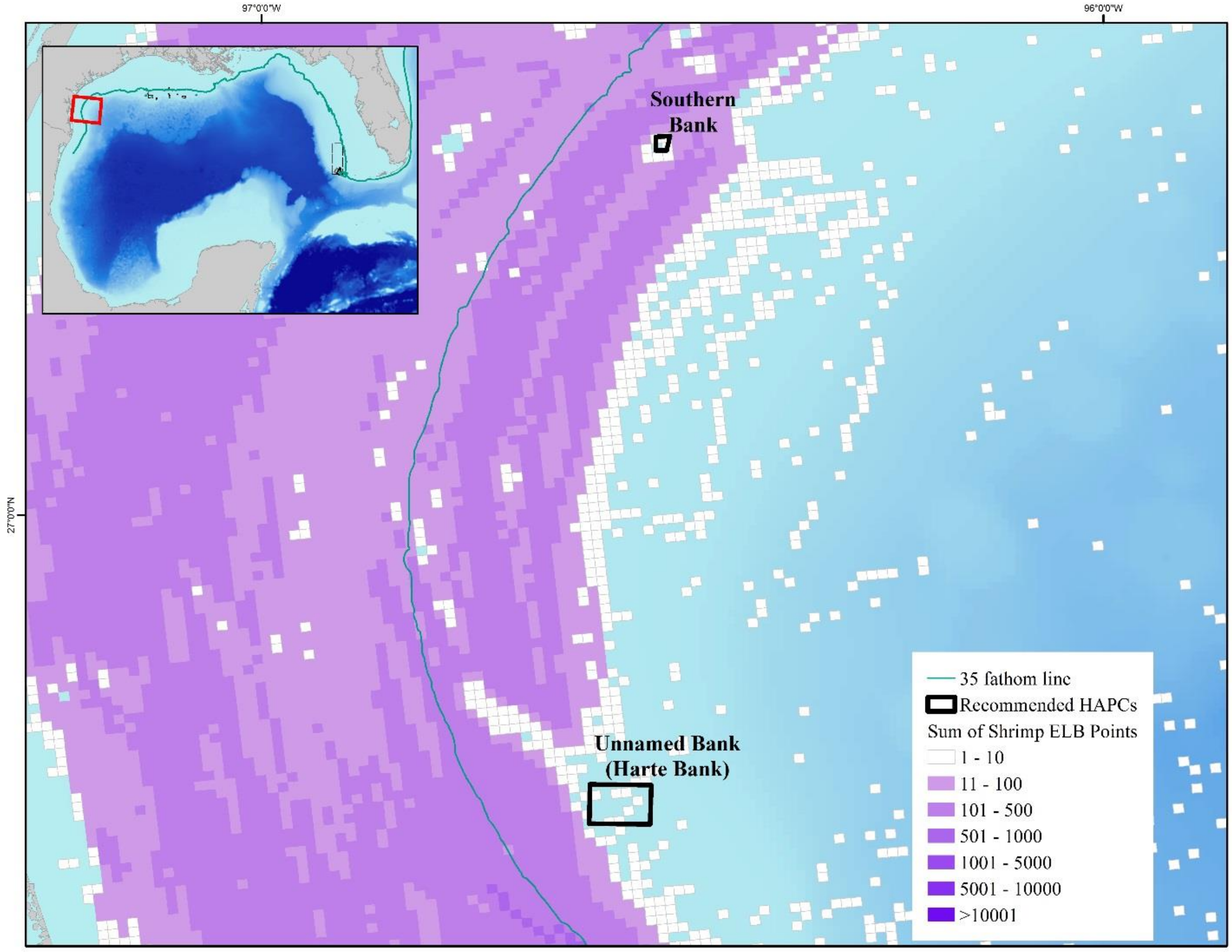

Figure 2.5.2. ELB data on the proposed HAPCs Harte Bank and Southern Bank. These data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm gridded cells. ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at the Council's Coral Portal.[10] Any ELB cell that is not white indicates shrimping activity (see description of data used in Section 1.1).

Preferred Alternative 2 would create an HAPC around the area that has been identified as Harte Bank. The DSCRTP database and new studies conducted by Texas universities have documented at least four species of black coral. Prior to research cruises in 2012, this area was poorly documented and unknown. The turbidity on this reef is not as high as that observed on other South Texas Banks (Hicks et al. 2014). It has one of the highest documented densities of black coral from the South Texas Banks (D. Hicks, University of Texas-Rio Grande Valley, pers. comm.). Harte Bank has high densities of roughtongue bass, greater amberjack, and red snapper relative to other species present on the bank (Hicks et al. 2014). It is also unique from other South Texas Banks in habitat and species assemblage (Hicks et al. 2014). This bank has little to no shrimping effort (Figure 2.5.2), but does have a moderate number of pings from vessels with VMS. However, when these data are further analyzed, most of the pings are from vessels with shrimp permits (Figure 2.5.1). As shrimp ELB data only contain points that are for actual fishing

[10] http://portal.gulfcouncil.org/coralhapc.html

(non-fishing data are filtered out), it is likely that this area is not a shrimping ground, and that the VMS data reflect transit and not fishing; however, it is possible that vessels are fishing for reef fish here. The northeastern corner polygon has a moderate number of pings (more than 100 points in the polygon) from vessels with bottom longlines. **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from damage caused by bottom-tending gear. **Preferred Option b** would prevent fishing from bottom-tending gear in this area and would protect the habitat and corals from future potential damage or mortality from bottom-tending gear.

Preferred Alternative 3 would create an HAPC in the area identified as Southern Bank. Southern Bank, approximately 29.7 nm east of Corpus Christi, Texas, is perhaps the best studied South Texas Bank with the most data available (Nash et al. 2013). The boundary of Southern Bank was modified from the Coral Working Group (2014) proposal after the input from the Shrimp AP in 2016; the boundary is now very close to the topographic features, which are two distinct peaks. The DSCRTP database and new studies conducted by Texas universities have documented three species of stony coral and four species of black coral in this area. Southern Bank has had 268 species of organisms identified, and of those, 49 species were not found on any other south Texas bank. It is likely that the high number of species at Southern Bank is because of topographic highs of the peaks (Nash et al. 2013) or possibly is an artifact of sampling effort.

Both VMS and shrimp ELB data do not provide evidence of heavy fishing with bottom-tending gear (Figure 2.5.1). **Option a** would not impose fishing regulations in this area and would not protect the habitat or corals from physical damage or mortality due to bottom-tending gear, and would allow for potential future fishing with bottom-tending gear. **Preferred Option b** would prevent fishing with bottom-tending gear in this area and would protect the habitat or corals from damage or mortality caused by bottom-tending gear. **Preferred Option b** would likely not be contentious for fishermen fishing with bottom-tending gear, other than the anchoring prohibition by fishing vessels, which could affect recreational fishermen.

Alternative 1 would have the least effects on the fishing community as it would maintain the status quo, and not protect areas that have been documented to have coral communities. However, **Alternative 1** would also not protect the identified coral communities from any future fishing effects and would be the least beneficial to the biological community. **Alternatives 2-3, Option a** would not be different from **Alternative 1** for the physical and biological/ecological or economic environment because they would not have any prohibitions on bottom-tending fishing in these areas. **Preferred Alternatives 2-3, Preferred Option b** would be the most beneficial to the physical and biological/ecological community, but the least beneficial to the fishing community. They would prohibit fishing with bottom-tending gear in an additional 11.6 nm^2 with depths of 162-492 ft (27-82 fathoms); however, none of these areas have substantial fishing activity documented within them, so this would only prevent future expansion of fishing activity to these areas, and is not likely to have any immediate effects on any fishery.

2.6 Action 6 – New Deep-water Coral Areas for HAPC Status Not Recommended to Have Fishing Regulations.

Alternative 1: No Action. Do not establish any new deep-water coral HAPCs.

<u>Preferred Alternative 2</u>: Establish a new HAPC named South Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
South Reed	A	83°56.220’	24°40.870’
Depth Range:	B	83°53.360’	24°40.926’
1314-4920 ft	C	83°53.300’	24°38.313’
(219-820 fathoms)	D	83°56.159’	24°38.257’
Area: 6.8 nm^2	A	83°56.220’	24°40.870’

<u>Preferred Alternative 3</u>: Establish a new HAPC named Garden Banks 299 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Bank 299	A	92°14.635’	27°42.963’
Depth Range:	B	92°11.697’	27°42.946’
1314-1968 ft	C	92°11.703’	27°40.457’
(219-328) fathoms	D	92°14.652’	27°40.435’
Area: 6.5 nm^2	A	92°14.635’	27°42.963’

<u>Preferred Alternative 4</u>: Establish a new HAPC named Garden Banks 535 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Banks 535	A	93°36.825’	27°27.314’
Depth Range:	B	93°33.894’	27°27.326’
1638-1968 ft	C	93°33.880’	27°24.711’
(273-328 fathoms)	D	93°36.811’	27°24.699’
Area: 6.8 nm^2	A	93°36.825’	27°27.314’

<u>Preferred Alternative 5</u>: Establish a new HAPC named Green Canyon 140 and 272 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 140/272 Depth Range: 984-3282 ft (164-547 fathoms) Area: 81.6 nm^2	A	91°36.342'	27°50.510'
	B	91°30.460'	27°50.448'
	C	91°30.496'	27°47.834'
	D	91°24.616'	27°47.768'
	E	91°24.654'	27°45.154'
	F	91°27.593'	27°45.187'
	G	91°27.666'	27°39.959'
	H	91°36.475'	27°40.052'
	I	91°36.442'	27°42.666'
	J	91°39.379'	27°42.695'
	K	91°39.347'	27°45.310'
	L	91°36.408'	27°45.281'
	M	91°33.470'	27°45.251'
	N	91°33.435'	27°47.865'
	O	91°36.375'	27°47.895'
	A	91°36.342'	27°50.510'

<u>Preferred Alternative 6</u>: Establish a new HAPC named Green Canyon 234 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 234 Depth Range: 1314-2952 ft (219-492 fathoms) Area: 13.6 nm^2	A	91°15.798'	27°47.662'
	B	91°12.859'	27°47.625'
	C	91°12.944'	27°42.397'
	D	91°15.881'	27°42.434'
	A	91°15.798'	27°47.662'

<u>Preferred Alternative 7</u>: Establish a new HAPC named Green Canyon 354 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 354 Depth Range: 1638-3282 ft (273-547 fathoms) Area: 6.8 nm^2	A	91°51.185'	27°37.572'
	B	91°48.249'	27°37.547'
	C	91°48.278'	27°34.932'
	D	91°51.212'	27°34.957'
	A	91°51.185'	27°37.572'

Preferred Alternative 8: Establish a new HAPC named Mississippi Canyon 751 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 751	A	89°49.883'	28°12.710'
Depth Range:	B	89°46.934'	28°12.770'
1968-2298 ft	C	89°46.866'	28°10.158'
(328-383 fathoms)	D	89°49.814'	28°10.098'
Area: 6.8 nm^2	A	89°49.883'	28°12.710'

Preferred Alternative 9: Establish a new HAPC named Mississippi Canyon 885 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 885	A	89°43.787'	28°04.993'
Depth Range:	B	89°40.841'	28°05.051'
1314-1968 ft	C	89°40.777'	28°02.439'
(219-328 fathoms)	D	89°43.721'	28°02.381'
Area: 6.8 nm^2	A	89°43.787'	28°04.993'

Discussion:

There are currently several HAPCs that do not have fishing regulations in the northwestern Gulf (see Table 1.1.2). The areas for consideration identified in this action are not areas that are fished but do contain communities that are rare and could be heavily degraded if damaged. These areas range in size from 6.5 nm^2 to just under 82 nm^2 and are in depths more than 984 ft (164 fathoms) (Table 2.6.1). These areas are in depths which are unlikely to have active fishing with bottom-tending gear, but still have unique coral communities warranting HAPC consideration. Shark Bottom Longline observer data do not show any commercial shark fishing taking place within these proposed areas. Recreational and other commercial HMS fishing permits issued to vessels in Gulf states were reviewed; however, no information is available regarding where those permit holders fish. The joint meeting of the Shrimp AP, Coral AP, and Coral SSC recognized the uniqueness of these areas, but the group did not recommend fishing regulations as necessary, at this time.

Table 2.6.1. Sites proposed in Action 6 for the proposed deep-water HAPCs in Action 8 with the area of each proposed alternative. Minimum and maximum depths are provided.

Site	Minimum depth ft (fathoms)	Maximum depth ft (fathoms)	Area (nm^2)
South Reed (Preferred Alternative 2)	1314 (219)	4920 (820)	6.8
Garden Banks 299 (Preferred Alternative 3)	1314 (219)	1968 (328)	6.5
Garden Banks 535 (Preferred Alternative 4)	1638 (273)	1968 (328)	6.8
Green Canyon 140/272 (Preferred Alternative 5)	984 (164)	3282 (547)	81.6
Green Canyon 234 (Preferred Alternative 6)	1314 (219)	2952 (492)	13.6
Green Canyon 354 (Preferred Alternative 7)	1638 (273)	3282 (547)	6.8
Mississippi Canyon 751 (Preferred Alternative 8)	1968 (328)	2298 (383)	6.8
Mississippi Canyon 885 (Preferred Alternative 9)	1314 (219)	1968 (328)	6.8

Alternative 1 would not create any new HAPCs in deep-water and would maintain the status quo. No additional deep-sea coral communities would be provided with HAPC designation.

Preferred Alternative 2 would establish an HAPC at the site South Reed. This site was identified by the CIOERT cruise as having numerous black corals and sponges as well as many octocorals. Other hard-bottom habitat was colonized by both *Lophelia pertusa* and *Madrepora* sp. (Brooke 2017; Reed et al. 2017; DSCRTP database). Golden crabs, finfish, and other invertebrates were also found at this site. This site is located southwest of Pulley Ridge and can be seen on the Coral HAPC viewer.[11] There are currently no fishing vessel points documented for this area from VMS and ELB data.

Preferred Alternative 3 would create an HAPC at Garden Banks 299. This site consists of carbonate rubble and pavement on a large feature with large black corals and thousands of octocorals (Brooke 2017). VMS data are likely not from fishing activity, as there are only 15 VMS points over the course of the entire time series (Figure 2.6.1). Shrimp ELB points are likely vessels in transit and not actively fishing as there is only one point in each grid and the depths are too deep for most species (Figure 2.6.2).

Preferred Alternative 4 would create an HAPC at Garden Banks 535. This site has high vertical relief and mounds with a variety of hard substrates (Brooks et al. 2016). Black whip corals and octocorals, including a new species, and live *Lophelia pertusa* thickets have been documented at this site (Brooks et al. 2016). No bottom-tending gear fishing effort has been documented for this site (Figure 2.6.1 and 2.6.2).

[11] http://portal.gulfcouncil.org/coralhapc.html

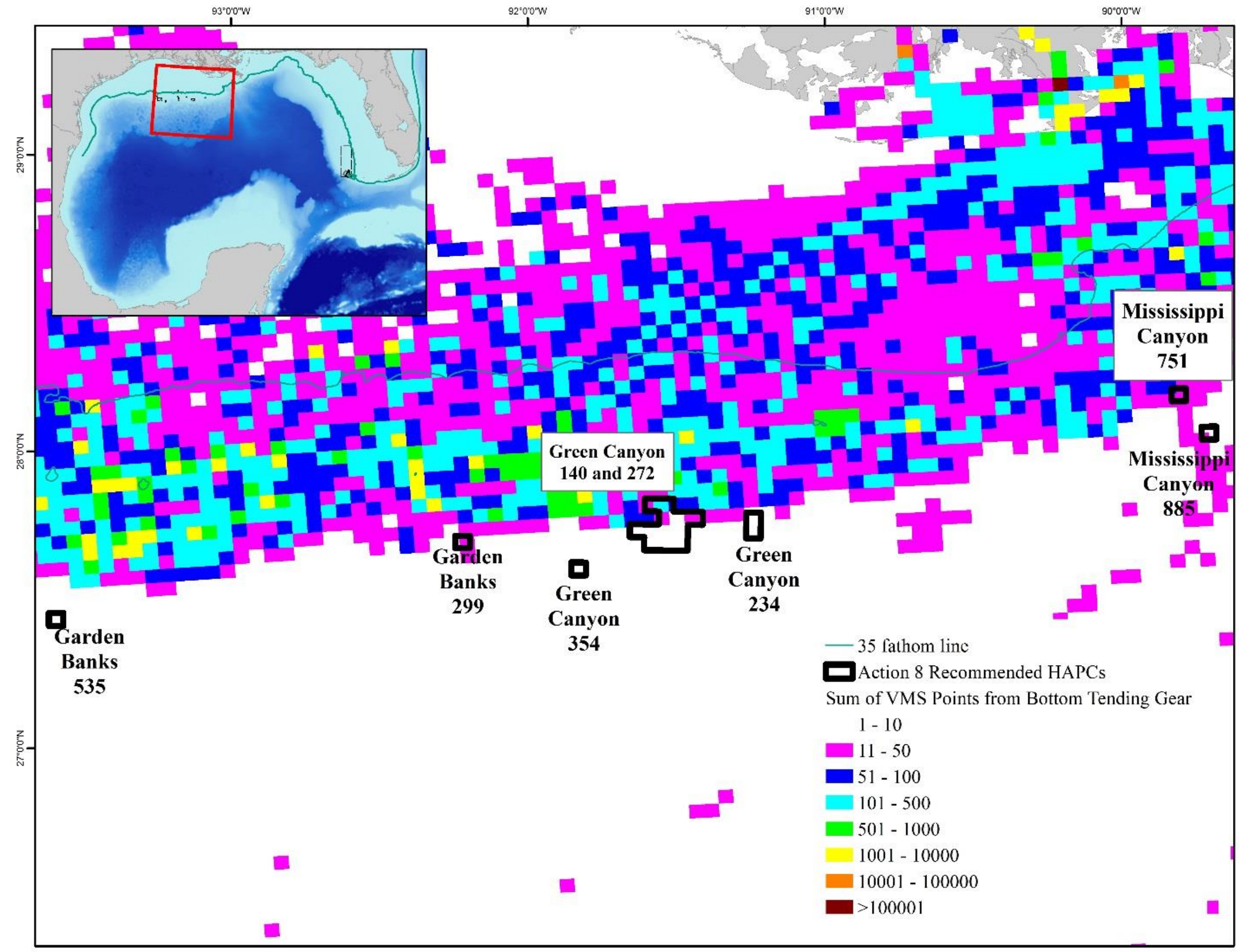

Figure 2.6.1. VMS data overlaid on the proposed HAPCs Garden Banks 535, Garden Banks 299, Green Canyon 354, Green Canyon 140 and 272, Green Canyon 234, Mississippi Canyon 751, and Mississippi Canyon 885. South Reed is not on this figure. VMS data include all bottom-tending gear and span the time from March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm gridded cells. VMS locations are collected once every hour regardless of fishing activity.

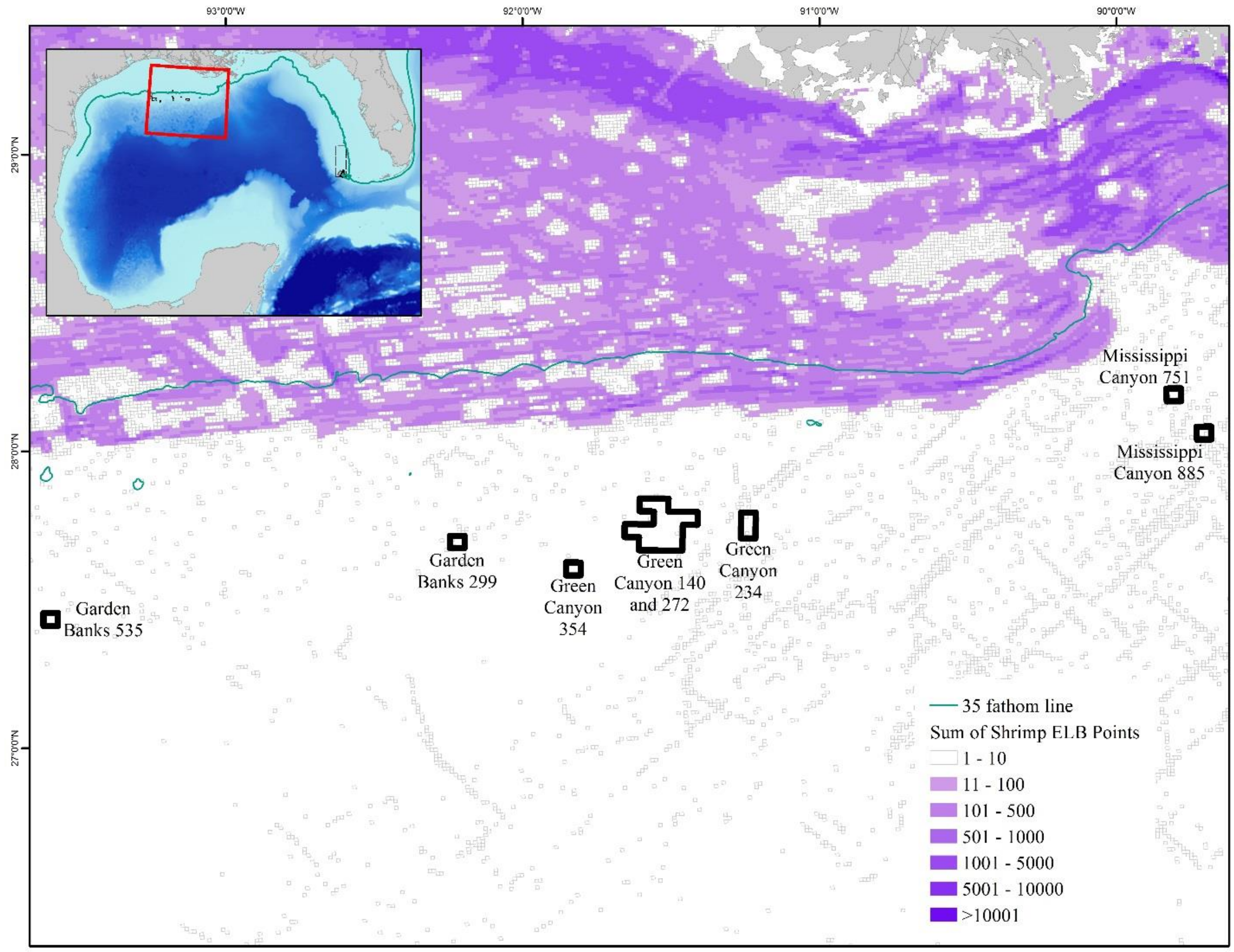

Figure 2.6.2. ELB data overlaid on the proposed HAPCs Garden Banks 535, Garden Banks 299, Green Canyon 354, Green Canyon 140 and 272, Green Canyon 234, Mississippi Canyon 751, and Mississippi Canyon 885. South Reed is not on this figure. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm gridded cells. ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at the Council's Coral Portal.[12] Any ELB cell that is not white indicates shrimping activity (see description of data used in Section 1.1).

[12] http://portal.gulfcouncil.org/coralhapc.html

Preferred Alternative 5 would create an HAPC at the site of Green Canyon 140/272. This site overlaps 12 lease blocks and is the largest in terms of square nautical miles in this action. There is a marked set of topographic features that were all incorporated into this site because they were all geographically connected. A large salt dome capped with carbonate slabs and boulders is home to old black corals (some aged to 1,500 years) and large octocorals. As depths increase to the southern end of this site, more stony coral and octocoral species are present, such as *Lophelia pertusa*. This site has had several research dives including one by a submersible, two by ROVs and has also had a scientific trawl to collect organisms. There is little evidence of fishing effort at this site (Figure 2.6.1 and 2.6.2) and the concentrated number of VMS pings in the north central portion is nearly evenly divided by bandit gear and bottom trawl gear (approximately 50-60 points each). This area was not recommended to have fishing regulations.

Preferred Alternative 6 would create a new HAPC in the area identified at Green Canyon 234. Coral cover at this site is dominated by gorgonians which have colonized a carbonate ridge at 1,476-1,638 ft (246-273 fathoms) depth and the scattered carbonate boulders in this area (Brooke 2017). The most abundant gorgonian species observed at this site was *Callogorgia americana delta*, and other gorgonians observed included *Paragorgia johnsoni*, *Paramuricea* sp, *Cheliodonisis* sp., *Muriceides* cf *hirta*, *Acanthogorgia aspera*, *Thesea* sp., and *Scleracis* sp. The carbonate ridge is also inhabited by colonies of live and dead *Lophelia* (Brooke 2017). Abundant fish species in this area included schools of roughy (*Hoplostethus occidentalis*), hakes (*Urophysis* sp), and tinselfish (*Grammicolepis brachiusculus*) (Brooke 2017). This area is not under consideration for fishing regulations.

Preferred Alternative 7 would create a new HAPC in the area identified at Green Canyon 354. This site is a large mound with approximately 180 ft of vertical relief (1902 ft [317 fathoms] deep at base, 1722 ft [287 fathoms] at top). Boulders at the top of the mound are colonized by *Lophelia pertusa*. These *Lophelia* mounds are primarily dead accumulations that are capped with live coral (Brooks et al. 2016). Schools of roughy (*Hoplostethus occidentalis*) seemed to be attracted to large sponges that are common at Green Canyon 354 (Brooke 2017). Invertebrates (primarily galatheid crabs) were associated with colonies of gorgonians including *Acanthogorgia aspera*, *Muriceides* cf *hirta*, *Nicella* sp., *Paramuricea* sp., *Swiftia exserta*, *Cheliodonisis a. mexicana* and *Paracalyptrophora carinata* which colonized carbonate boulders and outcrops on the sides of the mound at this site (Brooke 2017). Green Canyon 354 would not have fishing regulations.

Preferred Alternative 8 would create a new HAPC in the area identified at Mississippi Canyon 751. This site features an oblong area with about 65 ft of relief that is composed of exposed authigenic carbonate blocks, slabs, and outcroppings (Brooks et al. 2016). *Lophelia pertusa* and a diversity of large gorgonians have colonized these carbonate areas. Gorgonian species and genera documented here include *Callogorgia americana delta*, *Paramuricea* sp., *Muriceides* cf *hirta*, *Swiftia exserta*, and *Cheliodonisis a. mexicana.* Additionally, a species of bubblegum coral *Paragorgia johnsoni*, rare in the Gulf, was documented at Mississippi Canyon 751 (Brooke 2017). Another unusual aspect of this site was the abundance of live corals and chemosyntheic tubeworms located near active seepage. The black corals *Bathypathes* sp. and *Stichopathes* sp. were present at this site, as were golden crabs (*Chaceon fenneri*), blackbelly rosefish, and codlings (*Laemonema* sp.) (Brooke 2017). This site would not have fishing regulations.

Preferred Alternative 9 would create a new HAPC in the area identified at Mississippi Canyon 885. Mississippi Canyon 885 is characterized by a number of small mounds (salt domes) that are colonized by *Lophelia pertusa* and *Madrepora oculata*. These mounds, with up to 98 feet of vertical relief, are the only location in the northern Gulf where these species coexist. At this site, the octocoral *Callogorgia americana delta* was frequently observed with catshark egg cases attached (Brooke 2017). Mississippi Canyon 885 would not have fishing regulations.

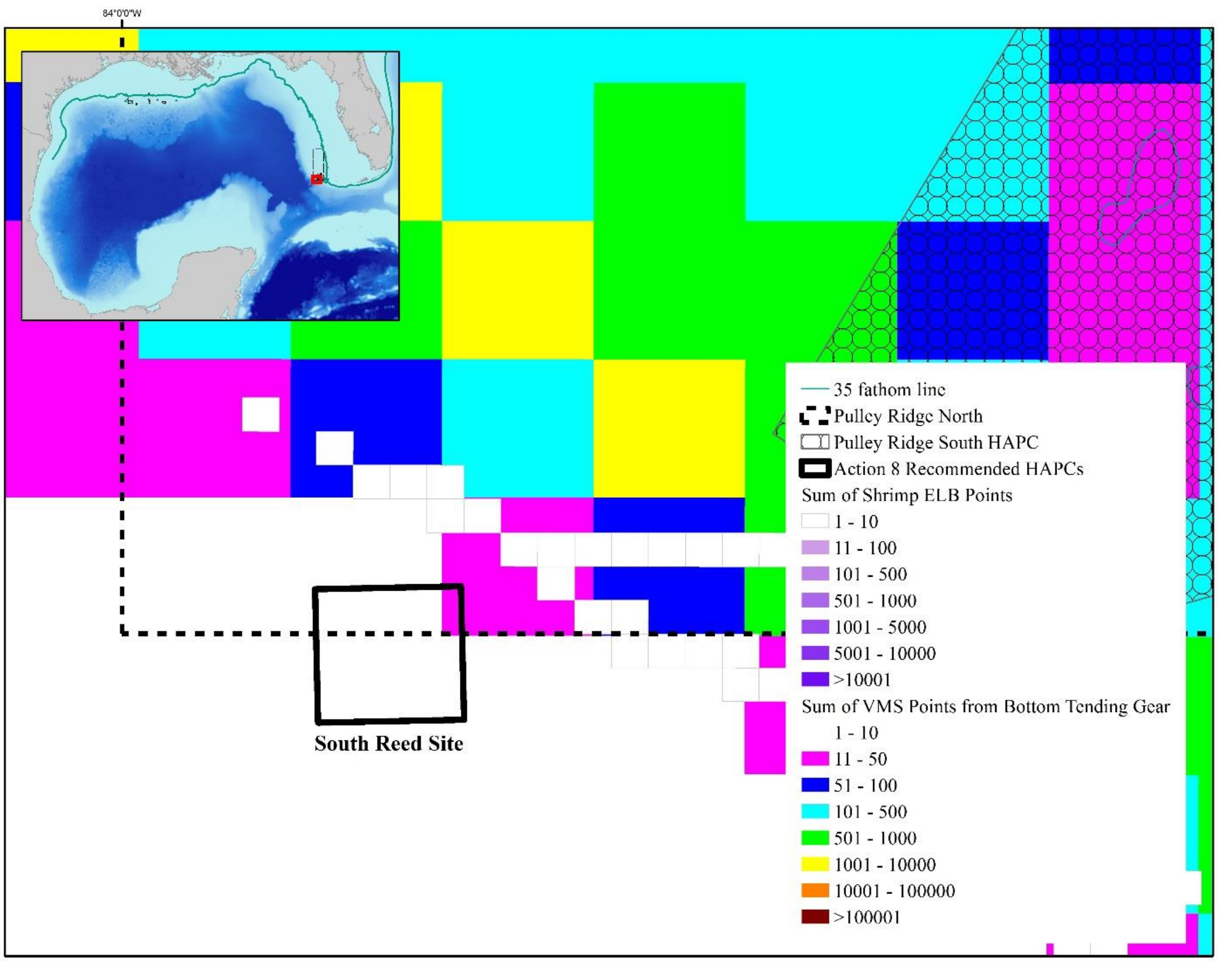

Figure 2.6.3. Fishing data overlaid on the proposed South Reed. VMS data include all vessels with bottom-tending gear and span March 2007 until July 2015. VMS data are aggregated on 2.5 nm by 2.5 nm gridded cells (the larger squares). VMS locations are collected once every hour regardless of fishing activity. ELB data include all points from 2004 to 2013 and are aggregated on 0.65 nm by 0.65 nm gridded cells (the smaller squares). ELB data are collected once every 10 minutes and have been filtered to only include data from active fishing. Interactive maps and data are provided at the Council's Coral Portal.[13] Magenta and dark blue indicate areas with few VMS pings; any ELB cell that is not white indicates substantial shrimping activity (see description of data used in Section 1.1).

[13] http://portal.gulfcouncil.org/coralhapc.html

Alternative 1 would maintain the status quo and would not establish the HAPCs listed in this action. However, **Alternative 1** would also not protect the identified habitat or coral communities from any future fishing effects and would be the least beneficial to the biological community. **Preferred Alternatives 2-9** would not be different from **Alternative 1** for either the biological or economic environment because there would not be any prohibitions on bottom-tending fishing in these areas. However, little to no fishing currently occurs in any of these areas based on VMS and ELB data.

2.7 Action 7 – Prohibit Dredge Fishing In All Existing HAPCs That Have Fishing Regulations

Alternative 1: No Action. No new dredge fishing specific management measures will be implemented for established HAPCs. Areas with dredge fishing restrictions already in place will retain those restrictions.

Preferred Alternative 2: Prohibit dredge fishing in all HAPCs that have fishing regulations.

Discussion:

Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels. These gear types can interact with the habitat and substrate, damaging or removing corals, octocorals, and sponges indiscriminately. This action proposes to add a prohibition on dredge fishing, as it is incorporated in the definition of bottom-tending gear, to existing HAPCs that do not currently prohibit dredge fishing but do prohibit other bottom-tending gear.

Currently West and East Flower Garden Banks HAPC, Florida Middle Grounds HAPC, and the Tortugas Marine Reserve have prohibitions on bottom-tending gear, including dredge fishing, within their boundaries. However, the current Pulley Ridge HAPC, Stetson Bank HAPC, and McGrail Bank HAPC only prohibit bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels; there is currently no explicit prohibition on dredge fishing.

Dredge fishing is most commonly used in shellfish fisheries but is not known to occur in the Gulf exclusive economic zone (EEZ). This action would allow for the implementation of consistent management measures across all currently existing HAPCs with fishing regulations.

This action would have no effect on the regulations placed on HAPCs that could be established through this amendment (Actions 2-6), and no other fishing regulation changes would be made to existing HAPCs.

Alternative 1 would retain the current regulations on existing HAPCs and would not impact the regulations placed on HAPCs implemented through this amendment. The inconsistencies in regulations outlined in the discussion would remain in place.

Preferred Alternative 2 would add dredge fishing to those types of bottom-tending gear that are prohibited within existing HAPCs with fishing regulations. **Preferred Alternative 2** would create regulatory consistency regarding dredge fishing across existing HAPCs with regulations but would not impact any fisheries, as dredge fishing is not a type of fishing that occurs in the Gulf at this time.

Neither alternative would affect social, economic, biological, or physical environments in the Gulf because dredge fishing does not occur. Both alternatives would affect the administrative environment, with **Preferred Alternative 2** implementing consistent regulations, and **Alternative 1** maintaining inconsistent regulations. For these actions there is no benefit to maintaining these inconsistent regulations. Inconsistent regulations can result in confusion and uncertainty in managing areas or fisheries.

CHAPTER 3. AFFECTED ENVIRONMENT

3.1 Description of the Fishery

3.1.1 Coral Fishery

Currently, black coral, stony coral, and members of the class Hydrozoa are managed under the Gulf of Mexico (Gulf) Fishery Management Council's (Council) Fishery Management Plan for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP). Black coral and stony coral harvest is prohibited in the exclusive economic zone (EEZ) of the Gulf of Mexico (Gulf). Octocorals are harvested in Florida state waters and in the EEZ off Florida, but this harvest is managed by Florida. Live rock harvest is also part of the Coral FMP, though harvest of wild live rock is prohibited in the Gulf.

Currently Florida manages the harvest of octocorals in state and adjacent federal waters through several requirements. Recreational collectors must possess a state saltwater fishing license and are limited to six colonies per day. Commercial collectors must possess a Saltwater Products License with the Restricted Species and Marine Life Tiered endorsements. Collection of octocoral must be by hand and all applicable gear restrictions apply. The quota for octocorals is 70,000 colonies annually. Harvest of attached substrate is limited to within one inch of the base; and harvest of *Gorgonia flabellum* (venus sea fan) and *Gorgonia ventalina* (common [purple] sea fan) and harvest of non-erect or encrusting octocorals is prohibited[14] (Florida Administrative Code (FAC) 68B-42). Florida specifies that harvest is not to occur in habitat areas of particular concern (HAPCs) in the Atlantic (FAC 68B-42.0036). In the years 2011-2016, between 28,000 and 70,000 colonies have been harvested, and the number of dealers has ranged between 41 and 55 (see Table 2.1.2). Most octocoral harvest occurs in state waters in the South Atlantic; the Gulf harvest is a mere fraction of the total reported for Florida (see Table 2.1.3)

Live rock is an assemblage of marine organisms attached to a hard substrate. Live rock harvest was first marketed in the 1970s after technical advances in aquarium filtration systems enabled invertebrate-dominated aquaria. Live rock harvest is now heavily regulated in the EEZ by a memorandum of understanding between the National Marine Fisheries Service (NMFS) and the U.S. Army Corps of Engineers, and wild live rock harvest is prohibited. To harvest aquacultured live rock in the Gulf or South Atlantic EEZ, a federal live rock permit must have been issued for a specific site. Any aquacultured live rock material must be deposited and harvested by hand, be distinguishable from surrounding substrates, and if endangered or threatened coral species are present on the substrate, harvest is prohibited. Specific requirements and regulations of aquacultured live rock are contained in 50 CFR Part 622, Subpart F. Additionally, appropriate Florida permits and endorsements are required for landing live rock.

3.1.2 Shrimp Fishery

The three species of penaeid shrimp (brown, white and pink) managed by the Council are short-lived and provide annual crops; royal red shrimp live longer, and several year classes may occur

[14] http://myfwc.com/fishing/saltwater/recreational/aquarium-species

on the fishing grounds at one time. The condition of each penaeid shrimp stock is monitored annually, and none has been overfished for more than 40 years. Cooperative management of penaeid shrimp species includes: simultaneous closure in both state and federal waters off the coast of Texas, the Tortugas Shrimp Sanctuary, and seasonally closed zones for the shrimp and stone crab fisheries off the coast of Florida. The royal red shrimp fishery is only prosecuted in deeper waters of the EEZ. An endorsement to the federal Gulf shrimp permit is required for vessels engaging in royal red shrimp fishing.

As of March 4, 2018, there were 1,424 valid or renewable federal Gulf shrimp permits and 292 endorsements for royal red shrimp. There has been a moratorium on the issuance of new Gulf federal commercial shrimp permits since 2007. Permits are fully transferrable, and renewal of the permit is contingent upon compliance with recordkeeping and reporting requirements. Royal red shrimp endorsements are available to any federal Gulf shrimp permit holder. State licensing may vary and vessels may have more than one state license. If selected, a vessel with a Gulf federal commercial shrimp permit must carry a NMFS-approved observer. The size of the shrimp industry and its total effort has been substantially reduced since the benchmark 2001-2003 time period established in Amendment 14 (GMFMC 2007). This effort reduction reflects both a reduction in the number of vessels estimated to be participating in the fishery, and a reduction in the level of activity for those vessels remaining in the fishery. Approximately 500 vessels with a federal Gulf commercial shrimp permit have electronic logbooks (ELBs) which help monitor shrimping effort in the Gulf.

Various types of gear are used to capture shrimp, including but not limited to: cast nets, haul seines, stationary butterfly nets, wing nets, skimmer nets, traps, and beam trawls. The otter trawl, with various modifications, is the dominant gear used in offshore waters, and there has been a decline in the number of otter trawls in recent years (NMFS 2014). Details about the specifics of each gear type as well as the historical development of the fishery can be found in Shrimp Amendments 13 and 14 (GMFMC 2007). Royal red shrimp have been a small component of Gulf shrimp landings since the early 1960s, but the number of active vessels is less than the number of endorsements. A few vessels in the Gulf shrimp fishery have targeted royal red shrimp, but fishing effort has been variable and inconsistent. Participation in this fishery requires larger vessels and heavier gear than that used for shallow-water penaeid shrimp. Although the industry continuously works to develop more efficient gear designs and fishing methods, the quad rig is still the primary gear used in federal waters. In recent years, the skimmer trawl has become a major gear in the inshore shrimp fishery in the northern Gulf. All trawls used in federal waters are required to have bycatch reduction devices (BRDs) unless: the vessel is fishing for and catching more than 90% royal red shrimp; the vessel is using a try net; the trawl is a rigid frame roller trawl; or the vessel is testing the efficacy of a BRD under authorization by NMFS.

3.1.3 Reef Fish Fishery

The commercial reef fish sector is managed through, but not limited to, annual catch limits (ACLs), annual catch targets (ACTs), accountability measures (AMs), size limits, trip limits, individual fishing quota (IFQ) programs, seasonal closures, time and area/gear restrictions, and gear requirements. Primary commercial gear types in the fishery are vertical lines (handlines and bandit gear) and bottom longlines. However, for some species such as hogfish, the primary harvest method is spearfishing (GMFMC 2016a).

Commercial vessels fishing for Gulf reef fish must have a Gulf reef fish permit, which is a limited access permit. As of September 7, 2017, 842 vessels have valid or renewable commercial reef fish permits. These vessels combine to make up the federal Gulf reef fish fleet, and any vessel in the fleet must have a vessel monitoring system onboard. Only vessels with a valid Gulf reef fish permit can harvest reef fish in the Gulf EEZ, and those that use bottom longline gear in the Gulf EEZ east of 85º30ˈW longitude must also have a valid Eastern Gulf longline endorsement. As of September 7, 2017, 62 of the permit holders have the longline endorsement, and all but one of the endorsement holders have a mailing address in Florida. In addition to these restrictions, operators of reef fish fishing vessels who want to harvest red snapper or grouper and tilefish species, must participate in the red snapper or grouper-tilefish IFQ programs. To harvest IFQ species, a vessel permit must be linked to an IFQ account and possess sufficient allocation for the species to be harvested.

The recreational sector consists of private anglers and the charter and headboat for-hire fleet. The recreational sector is managed through, but not limited to, ACLs, ACTs, AMs, size limits, bag limits, seasonal closures, time and area/gear restrictions, and gear requirements. The primary gear type in the fishery is vertical line gear (rod-and-reel); however, for some species such as hogfish, the primary harvest method is spearfishing (GMFMC 2016a).

Private recreational fishing vessels are not required to have a federal permit to harvest individual species or species complexes in the reef fish fishery from the Gulf EEZ. Anglers aboard these vessels, however, must either be federally registered or licensed in states that have a system to provide complete information on the states' saltwater anglers to the national registry. Any for-hire fishing vessel that takes anglers into the Gulf EEZ where anglers harvest species or complexes in the reef fish fishery must have a limited-access charter vessel/headboat (for-hire) permit for reef fish that is specifically assigned to that vessel. As of September 7, 2017, 1,278 vessels have valid or renewable for-hire reef fish permits.

Saltwater anglers in the Gulf region caught approximately 140.7 million finfish in 2014 (NMFS MRIP database). Approximately 10% of those fish were caught in the EEZ. The top four species groups by number of fish caught in all areas were herrings (34.9 million), drums (24.1 million), porgies (15.5 million), and jacks (11.9 million). Snappers ranked sixth (9.4 million). In the EEZ, the top five species groups by number of fish caught were snappers, sea basses, grunts, jacks, and herrings. Forty percent of snappers and 43% of sea basses that were caught by anglers in the Gulf in 2014 were caught in federal waters.

3.1.4 Highly Migratory Species Fishery

NMFS manages the commercial fisheries for Highly Migratory Species (HMS) such as Atlantic tunas, swordfish, and sharks in federal waters of the Gulf (Table 3.1.4.1). Gear types include: pelagic longline, bottom longline, purse seine, gillnet, handgear, and green-stick. Permits for commercial fishing of HMS include HMS limited access permits, commercial smoothhound shark permits, Atlantic tunas permits (general and harpoon), swordfish general commercial permit, HMS charter/headboat permit, and limited access Atlantic tunas purse seine permit. NMFS also manages recreational fishing and fishing tournaments for Atlantic HMS, including tunas, swordfish, sharks, and billfishes, in federal waters of the Gulf.

An HMS angling permit is required to fish recreationally for Atlantic HMS in federal waters, and most state waters for Atlantic tunas. A commercial Atlantic tunas general category permit, or a swordfish general commercial permit, can be used for fishing recreationally only when participating in a registered HMS tournament. An HMS charter/headboat permit is required for vessels taking for-hire passengers fishing for Atlantic HMS. Fishermen must report all landings of swordfish, billfish, and bluefin tuna (including bluefin tuna dead discards).

There are 53 species managed under the 2006 Consolidated Atlantic Highly Migratory Species Fisheries Management Plan and its amendments (Table. 3.1.4.1). In 2017, there were 1,032 commercial HMS permits and 6,869 recreational HMS permits.

Table 3.1.4.1. Species managed under the Consolidated Atlantic Highly Migratory Species Fisheries Management Plan and its amendments with common name and scientific name.

Common Name	***Scientific Name***	**Common Name**	***Scientific Name***
Skipjack tuna	*Katsuwonus pelamis*	Sandbar shark	*Carcharhinus plumbeus*
Albacore tuna	*Thunnus alalunga*	Smalltail shark	*Carcharhinus porosus*
Yellowfin tuna	*Thunnus albacares*	Night shark	*Carcharhinus signatus*
Bigeye tuna	*Thunnus obesus*	Sand tiger	*Carcharias taurus*
Bluefin tuna	*Thunnus thynnus*	White shark	*Carcharodon carcharias*
		Basking shark	*Cetorhinus maximus*
Swordfish	*Xiphias gladius*	Tiger shark	*Galeocerdo cuvier*
		Nurse shark	*Ginglymostoma cirratum*
Sailfish	*Istiophorus platypterus*	Sevengill shark	*Heptranchias perlo*
White marlin	*Kajikia albida*	Sixgill shark	*Hexanchus griseus*
Blue marlin	*Makaira nigricans*	Bigeye sixgill shark	*Hexanchus nakamurai*
Roundscale spearfish	*Tetrapturus georgii*	Shortfin mako	*Isurus oxyrinchus*
Longbill spearfish	*Tetrapturus pfluegeri*	Longfin mako	*Isurus paucus*
		Porbeagle	*Lamna nasus*
Bigeye thresher shark	*Alopias superciliosus*	Smooth dogfish	*Mustelus canis*
Thresher shark	*Alopias vulpinus*	Florida smoothhound	*Mustelus norrisi*
Blacknose shark	*Carcharhinus acronotus*	Gulf smoothhound	*Mustelus sinusmexicanus*
Bignose shark	*Carcharhinus altimus*	Lemon shark	*Negaprion brevirostris*
Narrowtooth shark	*Carcharhinus brachyurus*	Bigeye sand tiger	*Odontaspis noronhai*
Spinner shark	*Carcharhinus brevipinna*	Blue shark	*Prionace glauca*
Silky shark	*Carcharhinus falciformis*	Whale shark	*Rhincodon typus*
Galapagos shark	*Carcharhinus galapagensis*	Caribbean sharpnose shark	*Rhizoprionodon porosus*
Finetooth shark	*Carcharhinus isodon*	Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
Bull shark	*Carcharhinus leucas*	Scalloped hammerhead	*Sphyrna lewini*
Blacktip shark	*Carcharhinus limbatus*	Great hammerhead	*Sphyrna mokarran*
Oceanic whitetip shark	*Carcharhinus longimanus*	Bonnethead	*Sphyrna tiburo*
Dusky shark	*Carcharhinus obscurus*	Smooth hammerhead	*Sphyrna zygaena*
Caribbean reef shark	*Carcharhinus perezii*	Atlantic angel shark	*Squatina dumerili*

Seventy-three species of sharks are known to inhabit the waters along the U.S. Atlantic coast, including the Gulf of Mexico and the waters around Puerto Rico and the U.S. Virgin Islands. Forty-two species are managed by NMFS. There are 18 shark management groups (Table 3.1.4.2) that contain shark species (23 species) that legally may be harvested in commercial and recreational fisheries. These management groups are subject to management measures such as permitting and reporting requirements, commercial quotas, gear regulations, closed areas, closed seasons, observer coverage, vessel monitoring requirements, etc. All management groups have established ACLs and AMs.

The commercial Atlantic shark fishery is comprised of fishermen who hold shark directed or incidental limited access permits or open access smoothhound shark permits. Shark dealer permits are open access and required to take possession of sharks, or any part of the shark, for commercial purposes as they are offloaded from a fishing vessel. Shark fishermen are required to sell their catch to a federal permitted shark dealer.

Bottom longline is the primary commercial gear employed for targeting large coastal sharks in all regions. Since January 1, 2018, fishermen with a directed shark limited access permit using bottom longline gear have been required to use circle hooks. For a description of the history of bottom longline fishery management, please see Amendment 6 to the 2006 Consolidated HMS FMP and Amendment 5b to the 2006 Consolidated HMS FMP.

NMFS analyzed the number of vessels that were issued directed or incidental shark limited access permits as of October 2017 in conjunction with HMS fishing activities. Smoothhound permit holders were not considered because they do not generally use bottom longline gear. As of October 2017, there were a total of 490 commercial permit holders in the Atlantic shark fisheries (206 directed and 258 incidental permits). Of those 490 commercial permits, 304 have at least one or more Gulf fishing permits (spanish mackerel, king mackerel, gillnet for king mackerel, Gulf shrimp, Gulf royal red shrimp, Gulf reef fish, or Gulf reef longline). Of these 304 permit holders, 105 have either a directed or incidental limited access permit and either a Gulf reef fish and/or shrimp fishing permit. However, only 11 out of the 105 permit holders have active shark fishing vessels in the Gulf (active being defined as directed shark permit holders with valid permits that landed one shark per year based on 2018 HMS electronic dealer reports). Approximately, 231 permit holders have a valid shark directed or incidental limited access permit, but do not hold any of the Gulf fishing permits mentioned above. Only 7 of the 231 permit holders have active shark fishing vessels in the Gulf.

Table 3.1.4.2 provides a summary of these permit holders since 2012. Based on analysis of the shark limited access permit holders and their 2017 landings data (SERO Permit Office).

Table 3.1.4.2. Atlantic shark management groups that are available for commercial and recreational harvest.

Region or Sub-region	Management Group
Eastern Gulf of Mexico (East of 88° W. lat. only)	Blacktip Sharks Aggregated Large Coastal Sharks Hammerhead Sharks
Western Gulf of Mexico (West of 88° W. lat. Only)	Blacktip Sharks Aggregated Large Coastal Sharks Hammerhead Sharks
Gulf of Mexico (South and west of 25° 20.4' N. long.)	Non-Blacknose Small Coastal Sharks Smoothhound Sharks
Atlantic (North of 25° 20.4' N. lat.)	Aggregated Large Coastal Sharks Hammerhead Sharks Non-Blacknose Small Coastal Sharks Blacknose Sharks (South of 34° N. lat. only) Smooth Dogfish Sharks
No regional quotas	Non-Sandbar LCS Research Sandbar Shark Research Blue Sharks Porbeagle Sharks Pelagic Sharks Other Than Porbeagle or Blue

3.2 Description of the Physical Environment

The entire Gulf is approximately 453,000 square nautical miles (including state waters) (Gore 1992). The Gulf of Mexico Fishery Management Council (Council) is responsible for conservation and management of fishery resources in federal waters of the Gulf. These waters extend to 200 nautical miles offshore from the seaward boundary of the states Alabama, Florida, Louisiana, Mississippi, and Texas as those boundaries are defined by law. The Gulf is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel. Oceanic conditions are primarily affected by the Loop Current (Figure 3.2.1), the discharge of freshwater into the Northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf is both a warm temperate and a tropical body of water (McEachran and Fechhelm 2005). Based on satellite derived measurements from 1982 through 2009, mean annual sea surface temperature ranged from 73-83º F (23-28º C) including bays and bayous (Figure 3.2.1). In general, mean sea surface temperature increases from north to south depending on time of year with large seasonal variations in shallow waters (NODC 2012[15]). Physical environments in different regions of the Gulf are described in detail in the 2004 Essential Fish Habitat Final Environmental Impact Statement (EFH FEIS) and are summarized below. Site specific descriptions of the physical environment of each of the alternatives is contained in Chapter 2 discussions.

[15] http://accession.nodc.noaa.gov/0072888

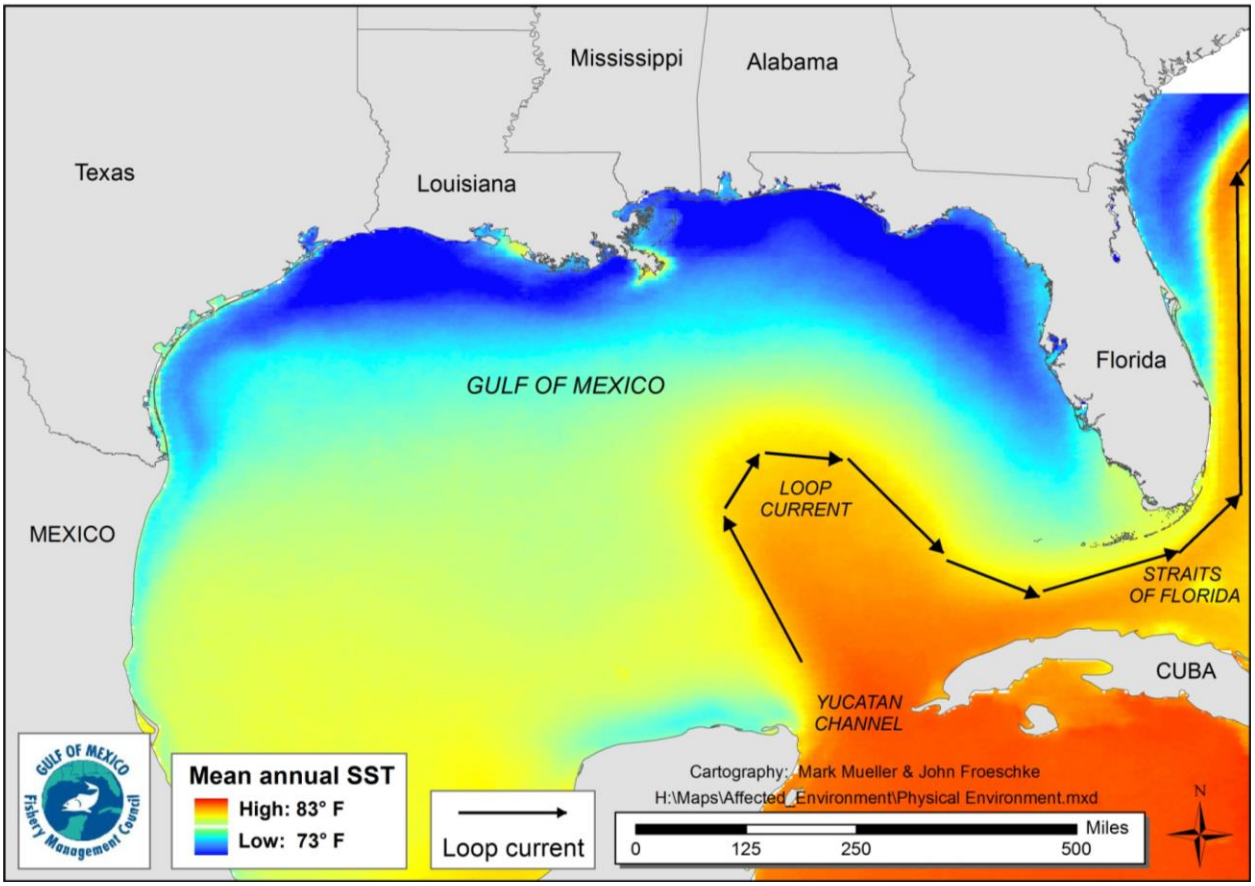

Figure 3.2.1. Physical environment of the Gulf including major feature names and mean annual sea surface temperature as derived from the Advanced Very High Resolution Radiometer Pathfinder Version 5 sea surface temperature data set.[16]

The Gulf continental shelf varies in width across the Gulf, and is widest in southern Florida (161.6 nm) and narrowest off the Mississippi River Delta (5.2 nm). The shelf also varies in depth of 0-654 ft (0-109 fathoms) and occupies about 35.2% of the surface area of the Gulf. Beyond the shelf, the depth of the Gulf drops off to a maximum depth of 12,630 ft (2,105 fathoms) in the Sigsbee Deep (Figure 3.2.2).

[16] http://accession.nodc.noaa.gov/0072888

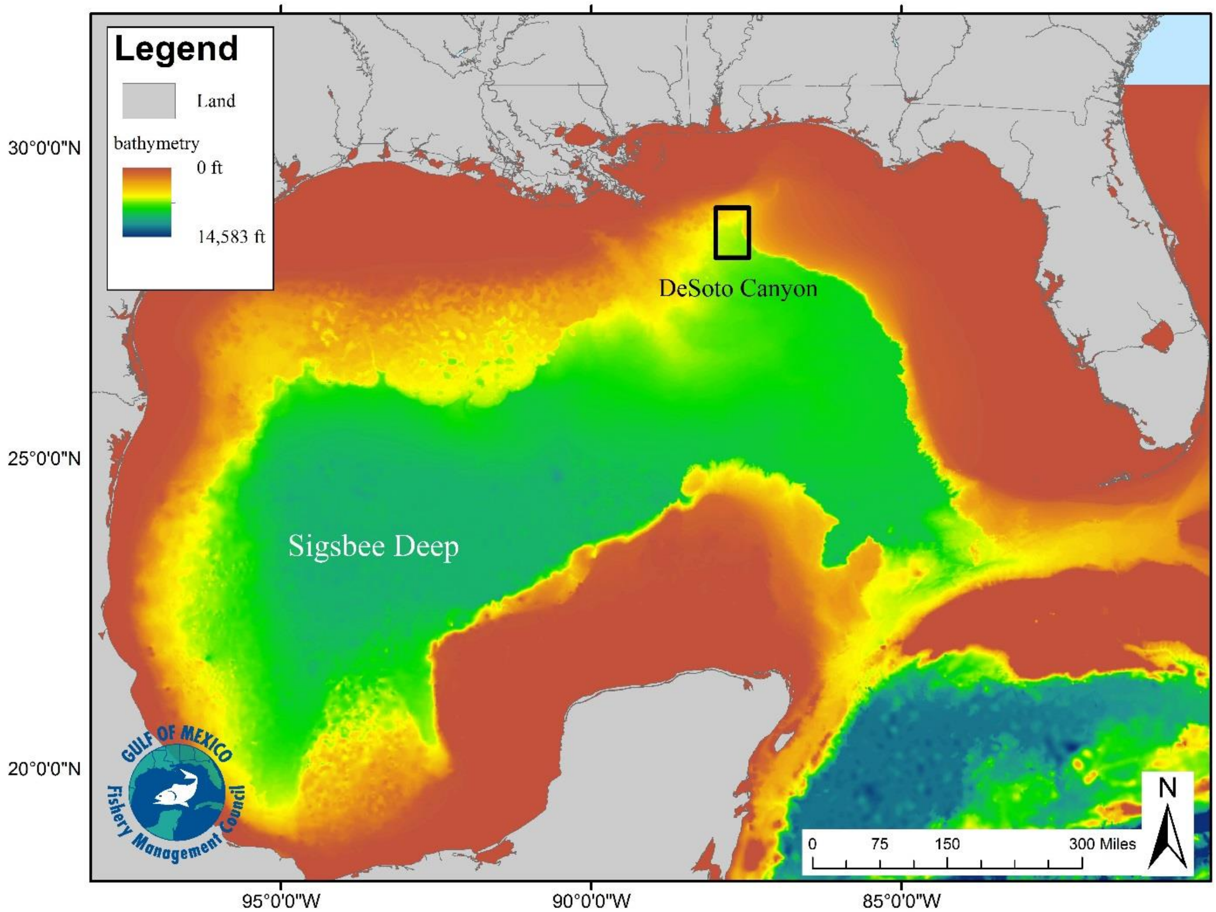

Figure 3.2.2. Bathymetry map of the Gulf of Mexico indicating the location of Sigsbee Deep and DeSoto Canyon.

Sediment makeup in the Gulf varies, but can generally be divided into two main zones, carbonate to the east of DeSoto Canyon (Figure 3.2.2.) and southward along the Florida coast, and terrigenous (made of material eroded from the land) to the west of DeSoto Canyon, past Louisiana to the Mexican border. Course sediments (sand and mixed sand) are present in shallow nearshore bottoms from the Rio Grande River to central Louisiana and are the dominant bottom type from shore to deeper water throughout the central third of the shelf. Course sediments are also present in the nearshore environment to a depth of 33 to 66 ft (5.5 to 11 fathoms) from the Everglades northward along the coast of Florida and covers the entire shelf out to a depth of 396 ft (66 fathoms) from Apalachicola Bay to Mobile Bay.

Fine sediments (silt and clay) are the dominant bottom type along the eastern and southwestern third of the continental shelf), which are areas influenced by the Mississippi and Atchafalaya Rivers and the present or ancestral Rio Grande river. Fine sediments are also strongly represented on the outer shelf beyond the 264 ft (44 fathom) isobaths. These sediments can affect shrimp and fish distributions directly in terms of feeding and burrowing activities or indirectly through food availability, water column turbidity, and related factors. Another swath of fine sediment runs southwestward from the Everglades, extending the full length of the Florida Keys.

The West Florida Shelf

The west Florida shelf bottom consists of a flat limestone table with localized relief due to relict reef or erosional structures. The benthic habitat types include low relief hard bottom, thick sand bottom, coralline algal nodules, coralline algal pavement, and shell rubble. The west Florida slope forms the edge of a sequence of carbonates intercalated with salt deposits more than 2.5 nm thick (Doyle and Holmes 1985). The west Florida shelf provides a large area of scattered hard substrates, some emergent, but most covered by a thin veneer of sand, that allow the establishment of a tropical reef. The only high-relief features are a series of shelf edge prominences that are themselves the remnants of extensive calcareous algal reef development prior to sea level rise.

In water depths of 228 to 294 ft (38 to 49 fathoms) along the southwest Florida shelf, a series of carbonate structures forms a series of steps along the shelf (Holmes 1981). This area corresponds to the partially buried, 3-mile wide reef complex known as Pulley Ridge.

The Florida Middle Grounds is a hard-bottom area approximately 87 nm west-northwest of Tampa, Florida. This region is characterized by steep profile limestone escarpments and knolls rising 32 to 43 feet above the surrounding sand and sand-shell substrate, with overall depths varying from 84 to 156 ft (14 to 26 fathoms) (Smith 1976).

Madison-Swanson is an area south of Panama City, Florida, containing high-relief hard bottom habitat. Depths run between 198 and 330 ft (33 and 55 fathoms), with habitats ranging from low-relief drowned patch reefs (1.6-8.2 ft vertical relief) to high-relief ridges and pinnacles (30-52 ft vertical relief).

The Dry Tortugas refers to an area of carbonate banks situated in open-ocean, approximately 70 miles west of Key West and 140 miles from mainland Florida. One of the banks is emergent with seven small, sandy islands (GMFMC 2000). The banks are roughly circular in pattern and are considered an atoll (Vaughan 1914). The shallow rim of the atoll is discontinuous and consists of Holocene (less than 10,000 years old) coral and the sandy islands. The Holocene reefs are approximately 46 feet thick, and are situated upon a preexisting high of the Key Largo Limestone, formed approximately 125,000 years ago (Shinn et al. 1977). Two substantial carbonate banks are situated in close proximity to the Dry Tortugas, known as Tortugas Bank and Riley's Hump. Tortugas Bank is directly west of the Dry Tortugas reefs, separated by a northeast-southwest trending channel. The channel is about 120 ft (20 fathoms) deep and 2.6 nm wide. The bank has a 98 ft escarpment on the west, a 49 ft face on the east, and crests at approximately 66 ft. Tortugas Bank is contemporary with the outlier reefs seaward of the Keys reef tract (Lidz et al. 1991; Ludwig et al. 1996).

Riley's Hump is a carbonate bank situated south-southwest of the Tortugas Bank. Based on its position, it is estimated to be equivalent in age to the Florida Middle Grounds (GMFMC 2000). It crests at about 100 ft, and the southern face exhibits a 66 ft escarpment situated at the shelf/slope break. Thick sedimentary deposits fill a trough separating Riley's Hump from Tortugas Bank.

Mississippi-Alabama Shelf

The Mississippi-Alabama Shelf is a small area extending from the Mississippi River Delta to DeSoto Canyon. The sediments found here are terrigenous to the west, integrating to carbonate sediments near DeSoto Canyon. The outer shelf is dominated by topographic features, which represent the remains of ancient reefs or shorelines. Pinnacles, made of hard, rigidly-cemented, irregularly-shaped aggregates of calcareous organic structures (Continental Shelf Associates, Inc. 1992) are found on the shelf and shelf break off the coasts of Alabama and Mississippi. These calcareous shelf edge and upper slope prominences are present in a wide band (approximately one mile) along the shelf edge from 85° to 88° W longitude (Ludwick and Walton 1957). The average pinnacle height has been measured at 30 ft with some pinnacles exceeding 49 ft in relief and the average water depth to the top of the pinnacles to be 324 ft (54 fathoms). Pinnacles ranged in water depths from 330 to 588 ft (55 to 98 fathoms) and water depths to the top of the pinnacles were found in two zones. In the shallower zone, the depth to the top of the pinnacles ranged from 222 to 276 ft (37 to 46 fathoms and in the deeper zone the depth to the top of the pinnacles ranged from 318 to 330 ft (53 to 55 fathoms). The greatest number of pinnacles were in water depths of 336 to 372 ft (56 to 62 fathoms) (Ludwick and Walton 1957).

Hard bottoms are found in several locations on the inner continental shelf adjacent to Florida and Alabama, in depths of 60 to 132 ft (10 to 22 fathoms) (Schroeder et al. 1988). These hard bottom areas lie south of the mouth of Mobile Bay and south of the Alabama/Florida state line. They have a vertical relief of 2 to 16 ft. Schroeder et al. (1988) identified these areas as either 1) massive to nodular sandstones and mudstones, 2) slabby aragonite-cemented limestone of broken shells and sandstone, 3) sandstone occurring in small irregular outcrops, or 4) calcite-cemented algal reef-like knobs.

Louisiana-Texas Shelf

The Mississippi River has had a profound effect on the landforms of coastal Louisiana (Louisiana Coastal Restoration, no date). The entire area is the product of sediment deposition following the latest rise in sea level about 5,000 years ago. For the last 1,200 years, sediment deposition has occurred primarily at the mouth of the Mississippi River on the edge of the continental shelf, in the area defined as the Mississippi River Delta Basin (Louisiana Coastal Restoration, no date). Its "bird's foot" configuration is characteristic of alluvial deposition, and as the large volumes of sediment required to maintain the delta are lacking, land is being lost rapidly (i.e. wetland loss is occurring). The Louisiana shelf varies in width from less than 10.4 nm off the passes of the "birdfoot" delta to nearly 108 nm off central and western Louisiana with little dramatic changes in topographic relief (Louisiana Coastal Restoration, no date). There is a tremendous fine-grain sediment load from the Mississippi River. The western portion of this shelf receives much less sediment, and instead has Holocene muds up to 30 ft thick. There are carbonate banks present, created during times of low sea level. About 260 nm upstream from its main outlet to the Gulf, the Lower Mississippi River is partly diverted into the Atchafalaya River.

The Louisiana/Texas Shelf is dominated by muddy or sandy, terrigenous sediments deposited by the Mississippi River. These terrigenous sediments cover over 1.7 nm of rock salt (Louann Salt) that has been deposited since the formation of the Gulf basin. Nearly 9 nm of sediment cover the Louann salt deposit south of the Louisiana/Texas state line. This huge sediment load has caused the deposits of salt to flow and form salt domes that now dot the inner shelf and adjacent coastal plain. Many large isolated salt stacks interconnected by intricate networks of growth faults characterize the middle shelf and lower Mississippi River delta region. More than 130 calcareous banks exist as a result of active salt domes in the northwest Gulf (MMS 1983). Banks of the northwestern Gulf have been grouped into two categories. The first are the mid-shelf banks which have a relief of 13 to 164 ft and have outcrops of relatively bare, bedded Tertiary limestones, sandstones, claystones, and siltstones. The second are also shelf-edge banks, located on salt dome structures, and have well developed carbonate caps with local areas of bare, bedded rocks (Rezak et al. 1985).

The continental shelf south of Matagorda Bay, Texas contains an area of drowned reefs on a relict carbonate shelf (Rezak et al. 1985). The banks vary in relief from 3 to 72 ft, are composed of carbonate substrata overlain by a veneer of fine-grained sediment, and the bottom sides of these reefs are immersed in a nepheloid layer that varies in thickness (up to 66 ft) (Rezak et al. 1985). Carbonate rubble is the predominant sediment on the terrace and peaks of the banks. The sediments around the reef consist of three main components: clay, silt, and coarse carbonate detritus. Several shallow water reefs also occur on the south Texas shelf.

3.3 Description of the Biological/Ecological Environment

3.3.1. Coral

The Gulf contains both coral reef communities and solitary coral colonies. These exist from nearshore environments to continental slopes and canyons, including intermediate shelf zones. Corals may dominate a habitat (coral reefs), be a significant component (hard bottom), or be individuals within a community characterized by other fauna (solitary corals).
A description of the biological/ ecological environments of each of the proposed HAPCs is described in detail in the discussion of each action in Chapter 2 and a more general description of the biological/ecological environments in the Gulf is thoroughly covered in the Final Essential Fish Habitat Environmental Impact Statement (GMFMC 2004) and summarized here.

Geologically and ecologically, the range of coral assemblages and habitat types in the Gulf are very diverse. The coral reefs of shallow, warm waters are typically built upon coralline rock and support a wide array of hermatypic and ahermatypic corals, finfish, invertebrates, algae, plants, and microorganisms. Hard bottoms and hard banks, found on a wider bathymetric and geographic scale, often possess high species diversity but may lack hermatypic corals, the supporting coralline structure, or some of the associated biota. In deeper waters, large elongate mounds called deep-water banks, hundreds of feet in length, often support a rich fauna compared with adjacent areas. Lastly are communities including solitary corals; this category often lacks a topographic relief as its substrate, but may use a sandy bottom instead. Solitary corals are a minor component of the bottom communities and comprise a minor percentage of the total coral stocks in the Gulf.

The West Florida Shelf

The west Florida shelf supports the growth of coralline algae at mid-shelf depths (198 to 264 ft [33 to 44 fathoms]), which creates algal nodules and a crustose algal pavement, allowing the development of deep-water hermatypic corals. Hard bottom areas along the shelf are colonized by seasonal algae, sponges, and other filter feeders of mixed warm temperate and tropical affinities.

At the Florida Middle Grounds, *Millepora* sp. is a primary frame builder, and populations of hermatypic scleractinians (*Porites, Dichocoenia, Madracis*) are present, as are alcyonaceans (*Muricea, Plexaura, Eunicea*).

The waters of Tampa Bay on the north and Sanibel Island on the south bound another west Florida shelf region with notable coral communities. The area consists of a variety of bottom types. Rocky bottom occurs at the 60 ft (10 fathom) isobath where sponges, alcyonarians, and the scleractinians *Solenastrea hyades* and *Cladocora arbuscula* are especially prominent.
The west Florida Shelf is an area known to support commercially important fish and shellfish populations, including mullet, spotted sea trout, Spanish mackerel, king mackerel, Florida pompano, snappers and groupers.

The Mississippi-Alabama Shelf

The northeastern portion of the Central Gulf exhibits a region of topographic relief, known as the "pinnacle trend," at the outer edge of the Mississippi-Alabama shelf between the Mississippi River and DeSoto Canyon. The region contains a variety of features from low-relief rocky areas to major pinnacles, as well as ridges, scarps, and relict patch reefs. The pinnacles in this area provide a substantial amount of surface area for the growth of sessile invertebrates and attract large numbers of fish. Additional hard-bottom features are located nearby on the continental shelf, outside the actual pinnacle trend.

The pinnacle-trend region was described in detail in the Mississippi-Alabama Continental Shelf Ecosystems Study: Data Summary and Synthesis (Brooks 1991), and includes an outline of the present-day biological assemblages. It states that these features are dominated by suspension feeding invertebrates. At pinnacle summits with extensive reef flats, sponges, sea fans, crinoids, and bryozoans can be found. Fishes associated with these flats include rough tongue bass, streamer bass, and vermillion snapper. On the vertical faces of the pinnacles, ahermatypic corals, crinoids, sea urchins, and basket stars are frequently observed. Other fishes observed on the pinnacles include red porgy, amberjack, tattler, red snapper, gag, dolphin, short bigeye, and Spanish flag (Continental Shelf Associates, Inc. 1992).

The presence of the Mississippi-Alabama hard banks may serve the function of connectivity for important reef species and may present the key habitat link between the reef fauna of the northwestern and northeastern Gulf. In these respects, the hard bottoms and topographic features are important in terms of the larger Gulf ecosystem as a whole.

The Louisiana-Texas Shelf

Vertical relief of the banks on the Louisiana-Texas Shelf varies from less than three ft to over 492 ft. These banks exist in water depths of 72 to 984 ft (12 to 164 fathoms). Hard-bottom areas in shallow water (less than 114 ft [19 fathoms]) off the coast of central Louisiana are associated with sessile epibiota (animals existing on top of habitats or other organisms) including hydroids, bryozoans, ascidians, encrusting sponges, and some ahermatypic stony corals. Fish species commonly seen in this area include Atlantic spadefish, red snapper, sheepshead, gray triggerfish, blue runner, vermilion snapper, rock hind, grouper species, and tomtate (Putt et al. 1986).

Hard-bottom areas in deeper waters (144 to 192 ft [24 to 32 fathoms]) included epibiota such as bryozoans, hard corals, octocorals, fire corals, sponges, sea whips, gastropods, hydroids, sea urchins, and lobsters. Over 47 species of fish were identified with the major species being greater amberjack, vermilion snapper, bigeye, blue runner, blue angelfish, French angelfish, queen angelfish, spotfin butterflyfish, and yellowtail reef fish (Putt et al. 1986).

Shelf-edge banks (e.g., East and West Flower Gardens, Geyer Bank, McGrail Bank, etc.) provide habitat for a diverse assemblage of fishes, with 95 species of reef fish observed by Dennis and Bright (1988). The Algal-Sponge Zone assemblage is the most important clear water community on these banks (Rezak et al. 1985). The Algal-Sponge Zone is dominated by coralline algae and supports deep-water alcyonarians, sponges, echinoderms, and small gastropods and pelecypods.

Fish species common in this zone include yellowtail reef fish, sand tilefish, cherubfish, and orangeback bass.

Mid-shelf banks (e.g., Sonnier, 29 Fathom, and Stetson) in the central and western Gulf contain the *Millepora*-Sponge Zone. This assemblage includes crusts of hydrozoan coral, *Millepora alcicornis*, and sponges. There are also sparsely distributed hermatypic and ahermatypic coral species found at Stetson Bank. Also on Stetson Bank, 140 species of reef and schooling fishes, 108 mollusks, and 3 predominant echinoderms have been reported. It attracts pelagic species (e.g., manta rays, devil rays, whale sharks) that travel across the continental shelf, using various banks, for seasonal feeding, mating, and as nursery ground.

3.3.2 Bycatch

The coral fishery is not monitored for bycatch purposes. There should be minimal impacts from the harvest of coral colonies conducted by hand. Rather, corals are subject to bycatch in bottom-tending gear fisheries.

3.3.3 Protected Species

The Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) provide special protections to some species that occur in the Gulf, and more information is available on the NMFS Office of Protected Resources website.[17] All 22 marine mammals in the Gulf are protected under the MMPA (Waring et al. 2016). Two marine mammals (sperm whales and manatees) are also protected under the ESA, and the Bryde's whale has been proposed for ESA listing. Other species protected under the ESA include sea turtle species (Kemp's ridley, loggerhead Northwest Atlantic Ocean distinct population segment (DPS), green South Atlantic and North Atlantic DPSs, leatherback, and hawksbill), fish species (Gulf sturgeon, smalltooth sawfish, Nassau grouper, giant manta ray, and oceanic whitetip shark), and coral species (elkhorn, staghorn, pillar, lobed star, mountainous star, and boulder star). Critical habitat designated under the ESA for *Acropora spp.* corals, smalltooth sawfish, Gulf sturgeon, and the Northwest Atlantic Ocean DPS of loggerhead sea turtles also occur in the Gulf, though only loggerhead and *Acropora* spp. critical habitat occurs in federal waters.

The following sections provide a brief overview of the marine mammals, sea turtles, and fish that may be present in or near areas managed by the Coral FMP.

Marine Mammals

Although most of the cetacean species reside in the oceanic habitat (greater than or equal to 200 m), the Atlantic spotted dolphin is found in waters over the continental shelf (20-200 m), and the common bottlenose dolphin (hereafter referred to as bottlenose dolphins) is found throughout the Gulf, including within bays, sounds, and estuaries; coastal waters over the continental shelf; and in deeper oceanic waters. Bottlenose dolphins in the Gulf are separated into and managed as demographically independent populations called stocks. Bottlenose dolphins are currently

[17] http://www.nmfs.noaa.gov/pr/laws/

managed by NMFS as 36 distinct stocks within the Gulf. These include 31 bay, sound, and estuary stocks; 3 coastal stocks; 1 continental shelf stock; and 1 oceanic stock (Waring et al. 2016). It is assumed that the dolphins occupying habitats with dissimilar climatic, coastal, and oceanographic characteristics might be restricted in their movements, and thus constitute separate stocks (Waring et al. 2016). The Eastern Coastal Stock ranges from 84°W to Key West, Florida, the Northern Coastal Stock ranges from 84°W to the Mississippi River Delta, and the Western Coastal stock ranges from the Mississippi River Delta to the Texas/Mexico border (Waring et al. 2016). The Continental Shelf stock inhabits waters from 20 to 200 m deep in the northern Gulf from the U.S./Mexican border to the Florida Keys (Waring et al. 2016). Marine Mammal Stock Assessment Reports and additional information on these stocks in the Gulf are available on the NMFS Office of Protected Species website.[18]

Bottlenose dolphin adults range from 6 to 9 feet (1.8 to 2.8 m) long and typically weigh between 300 to 600 lbs (136 to 272 kg). Females and males reach sexual maturity between ages 5 to 13 and 9 to 14, respectively. Once mature, females give birth once every 3 to 6 years. Maximum known lifespan is estimated to be 40-45 years for males and greater than 60 years for females (Reynolds 2000).

Sperm whales are one of the cetacean species found in offshore waters of the Gulf (greater than 200 m) and are listed endangered under the ESA. Sperm whales are the largest toothed whales and are found year-round in the northern Gulf along the continental slope and in oceanic waters (Waring et al. 2016). There are several areas between Mississippi Canyon and De Soto Canyon where sperm whales congregate at high densities, likely because of localized, highly productive habitats (Biggs et al. 2005; Jochens et al. 2008).

Bryde's whales are the only resident baleen whales in the Gulf, and on December 8, 2016, NMFS published a proposed rule to list the Bryde's whale as endangered under the ESA (81 FR 88639). Sightings of Bryde's whales in the Gulf have been consistently located in the DeSoto Canyon area in all seasons, along the continental shelf break between 100 m and 400 m depth (Mullin and Hoggard 2000; Maze-Foley and Mullin 2006; Mullin 2007; DWH MMIQT 2015). Consequently, LaBrecque et al. (2015) designated this area, home to the small resident population of Bryde's whales in the northeastern Gulf, as a Biologically Important Area.

Sea turtles

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the Gulf. Several volumes exist that cover the biology and ecology of these species (Lutz and Musick 1997; Lutz et al. 2003; Wyneken et al. 2013).

The original ESA listing for green sea turtles was replaced with the listings of 11 DPSs on April 6, 2016 (81 FR 20057). The DPSs in the North and South Atlantic, which include the green sea turtles in the Gulf were listed as threatened. Turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987; Walker 1994). At approximately 20 - 25 cm carapace length, juvenile green sea turtles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997) and their diet shifts towards herbivory. They

[18] http://www.nmfs.noaa.gov/pr/sars/species.htm

consume primarily seagrasses and algae, but are also known to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving depth of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

The hawksbill sea turtle pelagic stage lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988; Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic-stage hawksbill sea turtles. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbill sea turtles show fidelity to their foraging areas over several years (van Dam and Diéz 1998). Their diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Kemp's ridley sea turtle hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987; Ogren 1989). After the juveniles reach approximately 20 cm carapace length, they move to relatively shallow (less than 50 m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridley sea turtles feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridley sea turtles ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridley sea turtles most routinely make dives of 50 m or less (Soma 1985; Byles 1988). Their maximum diving range is unknown. Depending on the life stage a Kemp's ridley sea turtle may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985; Mendonca and Pritchard 1986; Byles 1988). Kemp's ridley sea turtles may also spend as much as 96% of their time underwater (Soma 1985; Byles 1988).

Leatherback sea turtles are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. However, they will enter coastal waters and are seen over the continental shelf on a seasonal basis feeding in areas where jellyfish are concentrated. Leatherback sea turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, their diet does not shift ontogenetically. Because their ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherback sea turtles are the deepest diving of all sea turtles. It is estimated that this species can dive in excess of 1,000 m (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984; Eckert et al. 1986; Eckert et al. 1989; Keinath and Musick 1993). Leatherback sea turtles may spend 74% to 91% of their time submerged (Standora et al. 1984).

The original ESA listing for loggerhead sea turtles was replaced in 2011 when NMFS and the U.S. Fish and Wildlife Service published a final rule designating 9 DPSs for loggerhead sea turtles (76 FR 58868, September 22, 2011, and effective October 24, 2011). This rule listed the Northwest Atlantic Ocean DPS, the only DPS within the action area, as threatened. Loggerhead sea turtle hatchlings forage in the open ocean and are often associated with *Sargassum* rafts (Hughes 1974; Carr 1987; Walker 1994; Bolten and Balazs 1995). The pelagic stage of these loggerhead sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerhead sea turtles reach 40-60 cm straight-line carapace length, they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here, they forage over hard and soft-bottom habitats (Carr 1986). Benthic foraging loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke et al. 1993). The maximum diving depths of loggerheads range from 211 m to 233 m (692-764 ft.) (Thayer et al. 1984; Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer et al. 1984, Limpus and Nichols 1988; Limpus and Nichols 1994; Lanyon et al. 1989), and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994; Lanyon et al. 1989).

Fish

Smalltooth sawfish historically ranged in the U.S. from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. Smalltooth sawfish primarily occur in the Gulf off peninsular Florida and are most common off Southwest Florida and the Florida Keys. Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 m (Bigelow and Schroeder 1953), while mature animals occur in waters in excess of 100 m (Simpfendorfer and Wiley 2005). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food sources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938; Bigelow and Schroeder 1953). The smalltooth sawfish were listed as an endangered species by NMFS in 2003 (68 FR 15674). Two DPSs were identified: the U.S DPS that occurs throughout the Gulf of Mexico from Texas to Florida, and along the east coast from Florida to North Carolina, and a foreign DPS that occupies waters outside the U.S. Critical habitat for the U.S. DPS of smalltooth sawfish was designated in September 2009 (74 FR 45353).

Nassau grouper is a shallow-water grouper species that has supported fisheries throughout the wider Caribbean, South Florida, Bermuda, and the Bahamas (Carter et al. 1994). On June 29, 2016, NMFS published a final rule (81 FR 42268) listing Nassau grouper as threatened under the ESA.

A final rule listing the oceanic white tip shark as threatened was published on January 30, 2018 (83 FR 4153). The oceanic whitetip shark is a large open ocean apex predatory shark found in subtropical waters around the globe. In the Western Atlantic, oceanic whitetips occur from Maine to Argentina, including the Caribbean and Gulf. It is a tropical, epipelagic species usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water, occurring from the surface to at least 152 m depth.

The giant manta ray was listed as threatened in 2018 (83 FR 2916). This is the world's largest ray with a wingspan of up to 29 ft. They are found across a broad range of depths and temperature; along the U.S. East Coast they are commonly found in waters from 19 to 22ºC. They have been observed in estuarine waters near oceanic inlets, using these waters as potential nursery grounds. Within the Gulf of Mexico, the giant manta ray is reported in the Flower Garden Banks National Marine Sanctuary.

NMFS conducted several Section 7 consultations on the species and critical habitat that NMFS concluded may be affected by the activities authorized under the Coral FMP. These consultations concluded informally with the determination that these activities may affect but are not likely to adversely affect Kemp's ridley sea turtles, the NWA DPS of loggerhead sea turtles, the North Atlantic DPS of green sea turtles, leatherback sea turtles, hawksbill sea turtles, smalltooth sawfish, corals, and loggerhead critical habitat. NMFS is currently consulting on the effects to the South Atlantic DPS of green sea turtles and Nassau grouper, and expects those consultations to also conclude informally.

3.4 Description of the Economic Environment

The actions in this amendment would potentially affect several fisheries in the Gulf. Other industries such as the oil, gas, and mineral mining industry as well as commercial shipping operate in, through, or near some of the proposed HAPCs. However, NMFS does not expect any of the actions in this amendment to result in additional impacts to non-fishing activities because all of the areas addressed in this amendment are essential fish habitat, which confers its own rules and regulations. In addition, the actions in this amendment do not propose additional rules, restrictions, or regulations on industries outside of fishing, because that is outside the jurisdiction of the Council. Therefore, the following discussion focuses on the economic environment of major fisheries in the Gulf that this amendment would potentially affect.

3.4.1 Corals

Corals in the Gulf are managed under the Coral FMP. As noted in Section 1.1, this FMP lists over 100 species of corals, but only black coral and stony coral are included in the fishery management unit. Harvests of these two types of corals are currently prohibited, except when authorized as a scientific research activity, exempted fishing permit activity, or exempted educational activity.

Harvest of wild live rocks is currently prohibited in the Gulf. On the other hand, aquacultured live rocks may be harvested, subject to certain limitations, such as a federal live rock permit for a specific site and depositing and harvesting live rock materials by hand (see Section 3.1.1 for more details on limits for harvesting aquaculture live rock). Live rock aquaculture is primarily undertaken in waters off of Florida. For the period 2010-2016, an annual average of approximately 67,000 pounds of live rock worth $159,000 (2016 dollars) were landed in Florida (FL FWC Commercial Fisheries Landings Summaries, March 13, 2018). Most of these landings were in the west coast of Florida.

The Generic ACL/AM Amendment removed octocorals from the Coral and Coral Reefs FMP, leaving the opportunity for states to manage the resources in federal waters adjacent to their state waters (GMFMC 2011). The Florida Fish and Wildlife Conservation Commission (FWC) currently manages the allowable octocoral fishery in both Florida state waters and federal waters adjacent to the state. For the period 2010-2016, an annual average of approximately 33,000 colonies worth $133,000 (2016 dollars) were landed in Florida (FL FWC Commercial Fisheries Landings Summaries, March 13, 2018).

Coral reefs provide humans with valuable goods and services, generally in the form of direct use values such as diving and snorkeling, indirect use values such as nursery functions for commercial and recreational species and coastal protection, and non-use values such as welfare associated with the existence of diverse natural ecosystems (Brander and van Beukering 2013). While a comprehensive economic valuation study for corals and coral reefs in the Gulf of Mexico has not been undertaken, there are several studies employing varying methods that have been attempted to provide economic values of coral reefs in certain areas in the U.S. Economic studies of coral reefs summarized in Brander et al. (2007) include Florida, Hawaii, American Samoa, Commonwealth of North Mariana Islands, Guam, Puerto Rico, and U.S. Virgin Islands. Based on these studies, the authors provide an estimate of total economic value of coral reef services for all U.S. coral reef jurisdictions at about $3.4 billion per year. The authors consider this as partial estimate due to the limited geographic coverage and limited set of services considered. Certain studies provide a much larger estimate of economic value based only on one particular region. For example, a study of the Northwestern Hawaiian Islands estimated the coral reef value at $34 billion per year but it also includes non-use values for the entire U.S. population (Bishop et al. 2011).

An economic study, with specific focus on marine conservation, was conducted on a set of proposals to expand the boundaries of the FGBNMS (Leewothy et al. 2016; Stefanski and Shimshack 2016). This study estimates the household's willingness to pay (WTP) for marine protection (expansion of the sanctuary's boundaries) using a stated preference technique. Annual WTP estimates range from $35 to $107 per household. When applied to total 114 million U.S. households, the total economic value would be about $16.4 billion to $18.3 billion over a 5-year period using 3%, 5%, and 7% discount rates.

3.4.2 Shrimp Fishery

The Gulf shrimp fisheries consist of three major sectors: harvesting sector, dealer/wholesaler sector, and processing sector. The following discussion provides summary statistics and selected characteristics for the harvesting sector only.

In 2003, a federal shrimp permit (SPGM) was instituted requiring vessels to possess the permit when fishing for shrimp in the Gulf EEZ. A moratorium on the issuance of new federal shrimp permits became effective in March 2007 and will expire in 2026. Currently, vessels must possess an SPGM when fishing for penaeid shrimp in the Gulf EEZ. In addition, a royal red shrimp endorsement (GRRS), which is an open-access permit for those holding an SPGM, is required for harvesting royal red shrimp in the Gulf EEZ.

Vessels, Landings and Ex-vessel Values

Brown and white shrimp are the dominant species in terms of landings, ex-vessel revenues, and number of vessels harvesting shrimp in the Gulf. For the period 2010-2016, an annual average of 3,552 vessels landed approximately 61 million lbs (mp) of brown shrimp with an ex-vessel value of about $206 million (2016 dollars); an annual average of 3,914 vessels landed approximately 61 mp of white shrimp valued at about $210 million (2016 dollars) (Table 3.4.2.0). Pink and royal red shrimp are relatively small sectors when compared to the brown and white shrimp sector. Only an average of eight vessels landed royal red shrimp in 2010-2016.

Table 3.4.2.0. Gulf shrimp landings, ex-vessel values, and number of vessels, 2010-2016. Pounds are in thousand pounds heads-off and ex-values are in thousand 2016 dollars.

	2010	2011	2012	2013	2014	2015	2016	Average
				Brown				
Vessels	2,824	4,142	3,889	3,536	4,006	3,381	3,087	3,552
Pounds	45,030	72,889	65,076	66,785	65,105	66,089	50,990	61,709
Values	$149,839	$215,753	$199,847	$259,645	$299,414	$165,137	$155,954	$206,513
				Pink				
Vessels	174	152	141	172	212	202	172	175
Pounds	5,429	4,337	3,449	3,630	4,136	4,975	5,020	4,425
Values	$17,646	$15,786	$13,097	$15,950	$23,976	$21,217	$21,450	$18,446
				White				
Vessels	3,735	4,245	4,108	3,883	4,051	3,568	3,809	3,914
Pounds	59,031	58,191	67,844	56,960	61,021	55,371	71,375	61,399
Values	$189,090	$224,520	$209,162	$242,659	$247,085	$154,017	$204,465	$210,143
				Royal Red				
Vessels	7	8	7	15	8	6	4	8
Pounds	131	195	181	199	97	155	118	154
Values	$767	$1,290	$1,209	$1,086	$615	$997	$783	$964

Source: GSS data set (C. Liese, pers. comm., March 6, 2018).

Selected Characteristics of Participating Vessels in the Gulf of Mexico Shrimp Fisheries

Selected characteristics of participating vessels in the Gulf shrimp fisheries from 2010 through 2014 are summarized in Table 3.4.2.1. The latest data on the economics and financial conditions of the Gulf shrimp fishery are for 2014. Data for later years are still being processed and compiled (Travis, NMFS-SERO, pers. comm. 2017). The number of permitted and non-permitted active vessels (i.e., vessels reporting landings in the Gulf shrimp fisheries) has been well above 4,000 from 2010 through 2014 (Table 3.4.2.1). Although approximately one-third of the active vessels were federally permitted (vessels with SPGM) at the beginning of the moratorium, less than 25% of active vessels had federal permits in each of the last 4 years (i.e., vessels without a federal permit are representing an increasing percentage of active vessels in the fisheries over time). Despite being fewer in number, federally permitted vessels accounted for as high as 67% of shrimp landings and 78% of shrimp revenues in the fisheries between 2010 and 2014. However, the permitted vessels' shares of the fisheries' landings and revenues have declined noticeably in the last 3 years, to only 56% and 68%, respectively, in 2014. Thus, vessels without permits have been accounting for a greater percentage of the fisheries' production and revenues in recent years.

The royal red shrimp sector is a relatively small segment of the Gulf shrimp fishery. As of August 25, 2017, there were 1,374 valid SPGM permits and 292 GRRS endorsements. On average (2010-2016), royal red shrimp accounted for less than 1% of total Gulf shrimp landings and ex-vessel revenues. For the period 2010-2016, an average of eight vessels landed royal red shrimp in the Gulf. The deep-water nature of the fishery, the limited geographic location of known fishing grounds, and the equipment needed to fish for royal red shrimp may have contributed to the relatively low share of the royal red shrimp landings and revenues to the overall shrimp landings and revenues in the Gulf. A more detailed discussion of vessels participating in the royal red shrimp fishery is provided in Shrimp Amendment 16 (GMFMC 2015) and Shrimp Amendment 17A (GMFMC 2016b).

Table 3.4.2.1. Selected characteristics of participation in the Gulf of Mexico food shrimp fisheries, 2010-2014.

	2010	2011	2012	2013	2014
Number of active vessels[1]	4,510	5,285	5,191	4,669	4,916
Percent of active vessels with a federal permit	25	22	22	24	23
Number of active vessels with a federal permits	1,132	1,187	1,148	1,110	1,116
Percent of active vessels without a federal permit	75	78	78	76	77
Number of active vessels without a federal permits	3,378	4,098	4,043	3,559	3,800
Number of federally-permitted vessels	1,685	1,641	1,587	1,544	1,515
Percent active	67	72	72	72	74
Percent inactive	33	28	28	28	26
Food shrimp landings (million lbs, heads-off)	111	137	134	128	131
Gross revenues (2014 dollars)	$354,000,000	$441,000,000	$389,000,000	$504,000,000	$557,000,000
Percent of food shrimp landings by federally-permitted vessels	63	67	63	60	56
Percent of food shrimp gross revenues by federally-permitted vessels	74	78	72	72	68

[1] Active means a vessel had at least 1 lb of Gulf of Mexico shrimp landings in a year based on Gulf Shrimp Survey (GSS) data (R. Hart, NMFS, pers. comm., April 25, 2016). These are likely overestimates of the actual number of active vessels because of vessel identification errors in the GSS data.

Key Economic and Financial Characteristics of Active Federally Permitted Gulf Shrimp Vessels

The following descriptions are based on a series of annual reports on the economics of the federal Gulf shrimp fishery for the years 2010 through 2014 (Liese 2011, 2013a, 2013b, 2014, 2016; Liese and Travis 2010; Liese et al. 2009a, 2009b). These reports present the results of the Annual Economic Survey of Federal Gulf Shrimp Permit Holders. The first survey, which was administered in 2007, collected data for the 2006 fishing year.

The type of economic data the survey collects is based on an accounting framework of money flows and values associated with the productive activity of commercial shrimping. With these data, three financial statements (the balance sheet, the cash flow statement, and the income statement) are prepared to give a comprehensive overview of the financial and economic situation of the offshore shrimp fishery[19].

Table 3.4.2.2 provides a summary of the financial statements for active vessels. Active vessels are defined as vessels with at least one pound of Gulf shrimp landings in a year based on General Social Survey (GSS) data (R. Hart, NMFS, pers. comm., April 25, 2016). Equity for an average active vessel has been increasing, particularly in 2014 when it increased by 19%. However, averages focusing on active vessels highlight the fragile economic state of shrimp harvesters between 2010 and 2014, as illustrated by average net revenue from operations and economic returns for active vessels. However, economic conditions for vessels active in the fishery improved dramatically in 2014. Ex-vessel shrimp prices increased significantly, most likely due to a decrease in shrimp imports caused by diseases (early mortality syndrome) that affected cultured shrimp in some major exporting countries (e.g., Thailand). In addition, fuel prices, a major cost item for shrimp vessel operation, decreased in 2014. In fact, the difference between the average ex-vessel shrimp price and the average fuel price for active, federally permitted vessels in the Gulf was greater in 2014 by far than in any other year during the moratorium, and likely since the early 2000s (Liese, NMFS-SEFSC, pers. comm. 2016). The difference was $0.96 in 2010 and increased to $1.27 in 2013 and $1.97 in 2014. According to data sources other than the Annual Economic Survey, fuel prices paid by commercial shrimpers likely continued to decline and then stabilized in 2015 and 2016,[20] while preliminary data suggests shrimp prices initially reverted to their lower levels in 2015 but subsequently began to rebound in 2016.[21] Thus, economic conditions in 2014 may reflect a "best case" scenario for the harvesting sector, with future economic conditions in the short term similar to those experienced on average between 2011 and 2014.

[19] For more detailed descriptions of these three financial statements, see Liese et al. 2009a.
[20] See recent trends in diesel fuel prices according to the Energy Information Administration (EIA) at: https://www.eia.gov/outlooks/steo/report/ Diesel fuel prices actually paid by commercial fishers, including commercial shrimpers, however, are less than the prices reported by the EIA as they do not pay federal or state excise taxes on fuel.
[21] See archives of Gulf of Mexico monthly shrimp statistics for preliminary shrimp price estimates at: http://www.st.nmfs.noaa.gov/commercial-fisheries/market-news/related-links/market-news-archives/index.

Table 3.4.2.2. Economic and financial characteristics of an average active vessel with a federal Gulf of Mexico commercial shrimp permit, 2007-2014. Dollar values are averages in 2014 dollars (Liese 2011, 2013a, 2013b, 2014, pers. comm., September 12, 2016; Liese and Travis 2010; Liese et al. 2009a, 2009b).

	2010[1]	2011	2012	2013[2]	2014[2]
Number of observations	332	368	370	293	333
Balance sheet					
Assets	224,083	235,021	244,911	249,398	272,193
Liabilities	54,259	42,939	51,250	37,095	19,825
Equity	169,823	192,082	193,661	212,303	252,368
Cash flow					
Inflow	250,988	330,645	399,822	417,630	376,594
Outflow	251,799	303,563	332,571	353,654	321,793
Net cash flow	-811	27,082	67,251	63,976	54,801
Income statement					
Revenue (commercial fishing operations)	248,753	312,141	324,557	361,229	373,490
Expenses	253,481	310,702	334,713	359,662	333,314
Variable costs: non-labor	50.8%	52.4%	55.6%	49.8%	49.7%
Variable costs: labor	27.2%	27.7%	25.1%	29.2%	32.2%
Fixed costs	21.9%	19.9%	19.2%	20.9%	18.1%
Net revenue from operations	-4,728	1,439	-10,155	1,567	40,176
Net receipts from non-operating activities	-730	15,833	71,991	52,961	1,221
Net revenue before tax (profit or loss)	-5,458	17,273	61,836	54,528	41,397
Returns					
Economic return	-2.1%	0.6%	-4.1%	0.6%	14.8%
Return on equity	-3.2%	9.0%	31.9%	25.7%	16.4%

[1] 2010 numbers are adjusted to remove payments and costs (cleanup activities) related to DWH.
[2] 2013 and 2014 numbers are preliminary.

Because of the difference in economic conditions and performance in the years before and after the *Deep-water Horizon* MC252 (DWH) oil spill, as well as the year-to-year differences in the years after the oil spill, Table 3.4.2.3 provides an average of financial and economic conditions for active permitted vessels between 2011 and 2014. Most importantly, average gross revenue from fishing operations was approximately $343,000, but net revenue from operations was only about $8,300. These estimates best approximate expected financial and economic conditions for these vessels in the foreseeable future.

Table 3.4.2.3 Average economic and financial characteristics for active vessels with a federal Gulf of Mexico commercial shrimp permit, 2011-2014. Dollar values are averages in 2014 dollars.

Number of observations	1,364
Balance sheet	
Assets	250,381
Liabilities	37,777
Equity	212,604
Cash flow	
Inflow	381,172
From shrimp (any)	91.1%
Outflow	327,895
Net cash flow	53,277
Income statement	
Revenue (commercial fishing operations)	342,854
Expenses	334,597
Variable costs: non-labor	51.9%
Variable costs: labor	28.6%
Fixed costs	19.5%
Net revenue from operations	8,257
Net receipts from non-operating activities	35,501
Net revenue before tax (profit or loss)	43,758
Returns	
Economic return	3.0%
Return on equity	20.8%

Key Economic and Financial Characteristics of Non-Federally-Permitted Shrimp Vessels

Some aggregate information regarding the non-federally-permitted vessel component of the fishery is in Table 3.4.2.1. Detailed information regarding the financial and economic performance of non-federally-permitted vessels is not available on an annual basis. However, economic surveys that collected such information from this fleet were conducted in 2008 (Miller and Isaacs 2011) and 2012 (Miller and Isaacs 2014). The following is a very brief summary of the latter report's more important findings regarding these vessels' financial and economic performance in 2012.

About 92% of these vessels are owner-operated. The average vessel was about 37 ft long, 24 years old, and had a current market value of about $60,000. Because only 7.7% of respondents had loan balances in 2012, average debt was relatively low ($2,354), and average equity was relatively high at approximately $58,000. The average non-federally permitted vessel took about 53 trips and spent an average of 97 days at sea in 2012. Most non-federally permitted shrimpers (approximately 72%) harvested only shrimp and no other type of seafood. Most of their shrimp was sold to dealers or processors. About 85% sold no shrimp to retailers and 60% claimed to have sold no shrimp directly to the public. Average cash inflows were about $85,000, considerably less than federally permitted vessels, while average cash outflows were approximately $59,000, about two-thirds of which was related to fuel, repairs and maintenance, and overhead. Average net cash flows were about $26,000, but median cash inflows were only $6,000. Net cash flows were zero or negative for about 40% of these vessels. When non-cash expenses like depreciation and owner's vessel time (opportunity cost) are included, and revenues unrelated to commercial fishing operations are excluded, average net income from operations falls to about -$5,000. Net income before taxes, which considers all sources of revenue, averaged $16,000. Net income before taxes was negative for the majority of these vessels.

Gulf Dealers and Processors

Between 2007 and 2014, the number of food shrimp dealers ranged from 600 (2013) to 896 (2011) in a given year. [22] In 2014, there were 627 dealers. Between 2011 and 2014, there were 1,427 dealers that purchased food shrimp at some point in time in the Gulf.[23] Most shrimp dealers in the Gulf are very specialized. Between 2007 and 2014, annual food shrimp purchases account for around 83% of their total annual seafood purchases. Between 2007 and 2014, annual Gulf food shrimp purchases by dealers averaged about $423 million per year (in 2014 dollars), while total seafood purchases by these dealers averaged almost $489 million. However, as in the harvesting sector, the value of these dealers' food shrimp and total seafood purchases increased significantly in 2013 and 2014 as a result of the increases in shrimp prices, with the value of shrimp purchases increasing by more than 50% between 2012 and 2014. The value of food shrimp purchases per dealer also increased by more than 50% during this time. Estimates of net revenue or profit specific to Gulf shrimp dealers are not currently available.

Although the average value of food shrimp and total seafood purchases per dealer appears relatively small, $24,000 and $50,000 in 2014 respectively based on the median, Gulf food shrimp dealers are a very heterogeneous group. Many, if not most, "dealers" are actually vessel owners and fishers who have chosen to act as their own dealers and bypass so-called "middlemen" so they can reduce costs and retain more of their net revenue (profit). So, as vessels move in and out of the fisheries, so do dealers to a large degree. A much smaller number of these dealers are also shrimp processors, and their operations generate much larger revenues on average (see below).

Between 2007 and 2014, the number of Gulf shrimp processors was relatively stable (except for 2012), averaging 53 during this time. Thus, the consolidation seen in this sector in previous years appears to have largely abated. During the same time period, the annual value of processed shrimp averaged more than $639 million (in 2014 dollars). Like dealers, shrimp processors are also very specialized. Shrimp products accounted for more than 90% of the total value processed between 2007 and 2014. However, processors are much larger businesses on average than dealers, with the value of processed shrimp and the value of all processed products averaging $4.46 million and $5.3 million per processor, respectively, between 2007 and 2014.

[22] A Gulf of Mexico shrimp dealer is a dealer located in a Gulf of Mexico port that purchased shrimp regardless of where shrimp were harvested.
[23] This estimated number of Gulf of Mexico shrimp dealers could be slightly overestimated because the estimates are based on a compilation of unique dealer codes across the GSS and Accumulated Landings System (ALS) databases. Although most codes could be matched across the databases, there are a relatively small number of inconsistencies in the codes within and across the databases over time.

Economic trends in the processing sector do not exactly mirror trends in the harvesting and dealer sectors. For example, for the sector as a whole, there were increases in the value of processed shrimp and all processed products by these processors in 2013 and 2014. Nevertheless, they were relatively minor in the aggregate, and those values were still below values seen in 2010. The reason for this difference is that processors process imported product as well as domestic product, whereas the dealer data only represents domestic production. A comparison of the dealer and processor data indicates that processors in the Gulf relied heavily on imported shrimp in 2010, and were able to increase the value of their processed products as a result. Conversely, in 2014, processors appear to have been much more dependent on domestic product. Moreover, although the value of the processed shrimp was somewhat less in 2014 relative to 2010, the average value of processed shrimp per processor was considerably greater in 2014 than in 2010, increasing by 189% from $2.8 million in 2010 to more than $8 million per processor in 2014. What this finding suggests is that, while imported product can and has been important for this sector as a whole, imports are important to a relatively small number of shrimp processors. Conversely, all Gulf shrimp processors are somewhat, if not highly, reliant on domestic production. Thus, when the value of domestic production increases, as it did in 2013 and 2014, such increases benefit all processors rather than only a relatively few.

Imports

Information on the imports of shrimp is available from NOAA.[24] Information on the imports of individual shrimp species is not available. In 2016, imports of all product forms of shrimp were approximately 1.33 billion pounds valued at approximately $5.70 billion. The dominance of imports is apparent when contrasted with domestic shrimp landings of approximately 292 million pounds valued at $522 million in 2016.

3.4.3 Reef Fish Fishery

Commercial Sector

Vessel Activity

Tables 3.4.3.1 and 3.4.3.2 contain information on vessel performance for commercial vessels that harvested any reef fish species in the Gulf in 2010-2016. The tables contain vessel counts from the National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) logbook data (vessel count, trips, and landings). Dockside values were generated using landings information from logbook data and price information from the NMFS SEFSC Accumulated Landings System (ALS) data. The data in Tables 3.4.3.1-3.4.3.2 cover all vessels that harvested any reef fish species anywhere in the Gulf, regardless of trip length or species target intent. Landings are presented in gutted weight and dollar values are expressed in 2016 dollars. Federally permitted vessels required to submit logbooks generally report their harvest of most species regardless of whether the fish were caught in state or federal waters.

[24] http://www.st.nmfs.noaa.gov/st1/trade

On average, 554 vessels per year landed any reef fish species in the Gulf (Table 3.4.3.1). These vessels, combined, averaged 6,608 trips per year in the Gulf on which reef fish were landed and 810 other trips (i.e., trips in the Gulf on which no reef fish were caught or trips taken in the South Atlantic). The average annual total dockside revenue (2016 dollars) was approximately $52.1 million from reef fish, approximately $1.31 million from other species co-harvested with reef fish (on the same trips), and approximately $1.5 million from other trips by these vessels on trips in the Gulf on which no reef fish were harvested or occurred in the South Atlantic (Table 3.4.3.2). Total average annual revenue from all species harvested by vessels harvesting reef fish in the Gulf was approximately $54.9 million, or approximately $99,593 per vessel.

Table 3.4.3.1. Summary of vessel counts, trips, and logbook landings (pounds gutted weight (gw)) for vessels landing at least one pound of reef fish, 2010-2016.

Year	Number of Vessels	Number of Gulf Trips that Caught Reef Fish[1]	Reef Fish Landings (lbs gw)	"Other Species" Landings Jointly Caught with Reef Fish (lbs gw)	Number of Other Trips[2]	Landings on Other Trips (lbs gw)
2010	577	5,981	10,338,604	679,635	593	592,400
2011	561	6,541	13,344,918	944,170	767	787,665
2012	554	6,593	13,983,396	968,920	904	741,806
2013	531	6,288	13,625,944	768,890	799	789,777
2014	576	6,979	15,279,827	895,524	1,010	848,153
2015	548	6,997	15,385,266	738,966	784	800,444
2016	529	6,878	14,532,146	684,206	810	932,554
Average	554	6,608	13,784,300	811,473	810	784,686

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.
[1]Reef fish includes only species managed under the Gulf Reef Fish FMP.
[2]Includes Gulf trips on which no reef fish were harvested as well as trips in the South Atlantic regardless of what species were harvested, including reef fish (snapper/grouper).

Information similar to those in Table 3.4.3.1 and Table 3.4.3.2 are shown in Table 3.4.3.3 and Table 3.4.3.4, respectively, with focus on certain reef fish species complex—all reef fish, snappers, groupers, tilefishes, and jacks. Snappers and groupers are the two major components of the reef fish fishery, with tilefishes and jacks showing relatively low landings and revenues. Vessels harvesting snappers or groupers also harvest about the same amount of other species. Vessels harvesting tilefish or jacks, on the other hand, harvest more of other species. Vessels harvesting snappers or groupers generate more revenues from these species, but revenues from other species are not too far behind. For vessels harvesting tilefishes or jacks, revenues from other species are substantially higher than those from tilefishes or jacks, indicating that these vessels are not as dependent on tilefish or jacks as those harvesting snappers or groupers on these species.

Table 3.4.3.2. Summary of vessel counts and revenue (2016 dollars) for vessels landing at least one pound of reef fish, 2010-2016.

Year	Number of Vessels	Dockside Revenue from Gulf Reef Fish	Dockside Revenue from "Other Species" Jointly Caught with Reef Fish	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
2010	577	$34,717,646	$1,050,262	$877,808	$36,645,716	$63,511
2011	561	$45,328,460	$1,410,373	$1,315,769	$48,054,602	$85,659
2012	554	$49,760,147	$1,469,879	$1,454,395	$52,684,421	$95,098
2013	531	$52,954,318	$1,344,204	$1,640,058	$55,938,580	$105,346
2014	576	$60,527,559	$1,488,010	$1,906,147	$63,921,716	$110,975
2015	548	$62,524,673	$1,289,604	$1,461,367	$65,275,644	$119,116
2016	529	$59,092,632	$1,165,635	$1,869,070	$62,127,337	$117,443
Average	554	$52,129,348	$1,316,852	$1,503,516	$54,949,717	$99,593

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.

Table 3.4.3.3. Average (2010-2016) vessel counts, trips, and logbook landings (pounds gutted weight (gw)) for vessels landing at least one pound of selected reef fish species complex, 2010-2016.

Species Complex	Number of Vessels	Number of Gulf Trips that Caught Fish in the Complex	Species Complex Landings (lbs gw)	"Other Species" Landings Jointly Caught with a Species in the Complex (lbs gw)	Number of Other Trips[1]	Landings on Other Trips (lbs gw)
All Reef Fish	554	6,608	13,784,300	811,473	810	784,686
Snappers	528	5,817	6,815,666	6,516,164	1,406	1,891,608
Groupers	456	4,756	6,001,244	5,937,697	1,627	2,295,028
Tilefish	121	395	403,575	1,561,987	1,550	5,309,510
Jacks	281	1,425	477,600	4,009,483	3,127	6,932,897

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.

[1]Includes Gulf trips on which no reef fish were harvested as well as trips in the South Atlantic regardless of what species were harvested, including reef fish (snapper/grouper).

Table 3.4.3.4. Average (2010-2016) vessel counts and revenue (2016 dollars) for vessels landing at least one pound of selected reef fish species complex.

Species Complex	Number of Vessels	Dockside Revenue from Fish in the Species Complex	Dockside Revenue from "Other Species" Jointly Caught with Species in the Species Complex	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
All Reef Fish	554	$52,129,348	$1,316,852	$1,503,516	$54,949,717	$99,593
Snappers	528	$26,438,465	$22,619,144	$5,525,408	$54,583,018	$103,575
Groupers	456	$23,678,128	$20,301,422	$7,786,467	$51,766,017	$114,095
Tilefish	121	$1,112,451	$6,202,630	$19,631,413	$26,946,495	$221,261
Jacks	281	$675,178	$14,719,152	$25,486,492	$40,880,822	$145,362

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.

Table 3.4.3.5 and Table 3.4.3.6 also have similar information as the former tables but focus on vessels using selected gear types. The gears selected are bottom longline, buoy gear (excluding

HMS buoy gear), bandit, pots/traps, diving gear, hook-and-line, pots/traps and nets. The numbers do not differ much from those for all reef fish species because few gears are excluded.

Table 3.4.3.5. Summary of vessel counts, trips, and logbook landings (pounds gutted weight (gw)) for vessels landing at least one pound of reef fish using certain gears, 2010-2016.

Year	Number of Vessels	Number of Gulf Trips that Caught Reef Fish Using Certain Gears[1]	Reef Fish Landings Using Certain Gears (lbs gw)	"Other Species" Landings Jointly Caught with Reef Fish Using Certain Gears (lbs gw)	Number of Other Trips[2]	Landings on Other Trips (lbs gw)
2010	557	5,525	9,913,243	658,198	271	186,262
2011	539	6,181	13,165,785	921,008	363	323,760
2012	533	6,219	13,822,540	933,986	500	393,268
2013	513	6,020	13,517,568	742,944	385	317,187
2014	547	6,541	15,064,398	852,348	577	442,281
2015	520	6,557	15,209,770	696,020	371	295,186
2016	504	6,445	14,387,502	648,238	418	306,549
Average	530	6,213	13,582,972	778,963	412	323,499
	2010-2016 Average, by Gear Type					
Longline	68	702	4,428,395	87,132	27	24,019
Bandit	267	3,126	7,433,705	524,341	16	11,504
Diving	47	353	156,780	6,891	21	596
Handline	273	2,434	1,790,884	192,567	485	394,376
Others	6	22	49,595	2,599	22	65,872

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.
[1]Gears include longline and buoy gear (longline), bandit, diving gear, hook-and-line, and others (pots/traps, nets, others).
[2]Includes Gulf trips on which no reef fish were harvested as well as trips in the South Atlantic regardless of what species were harvested, including reef fish (snapper/grouper).

Ex-vessel Prices

The dockside or ex-vessel price is the price the vessel receives at the first sale of harvest. Over the period 2010-2016, the average annual ex-vessel price per pound of reef fish harvested in the Gulf was $3.78 (2016 dollars) and ranged from $3.36 in 2010 to $4.07 in 2016. For the various species complexes, the average prices per pound were $3.88 for snappers, $3.95 for groupers, $2.76 for tilefishes, and $1.41 for jacks.

Individual Fishing Quota

There are two IFQ programs that apply to certain species of reef fish in the Gulf. The Grouper-Tilefish IFQ program is a multi-species program with five share categories: gag, red grouper, other shallow-water groupers, deep-water groupers, and tilefishes. The Red Snapper IFQ program is a single-species, single-share category program. Details of these programs may be found at the NOAA website.[25]

Table 3.4.3.6. Summary of vessel counts and revenue (2016 dollars) for vessels landing at least one pound of reef fish using certain gears, 2010-2016.

Year	Number of Vessels	Dockside Revenue from Reef Fish Using Certain Gears[1]	Dockside Revenue from "Other Species" Jointly Caught with Reef Fish Using Certain Gears	Dockside Revenue on Other Trips	Total Dockside Revenue	Average Total Dockside Revenue per Vessel
2010	557	$33,255,543	$1,014,099	$254,772	$34,524,414	$61,983
2011	539	$44,666,622	$1,361,835	$519,977	$46,548,434	$86,361
2012	533	$49,158,059	$1,369,901	$681,022	$51,208,982	$96,077
2013	513	$52,535,811	$1,284,765	$752,633	$54,573,209	$106,381
2014	547	$59,714,333	$1,393,637	$984,861	$62,092,831	$113,515
2015	520	$61,862,116	$1,203,448	$541,543	$63,607,107	$122,321
2016	504	$58,500,690	$1,081,828	$591,684	$60,174,202	$119,393
Average	530	$51,384,739	$1,244,216	$618,070	$53,247,026	$100,862
	2010-2016 Average, by Gear Type					
Longline	68	$16,877,174	$164,647	$22,204	$17,064,025	$250,942
Bandit	267	$28,433,887	$794,948	$22,963	$29,251,798	$109,557
Diving	47	$590,910	$13,406	$12,922	$617,237	$13,053
Handline	273	$6,357,651	$344,080	$835,009	$7,536,739	$27,564
Others	6	$169,823	$2,698	$79,494	$252,014	$40,867

Source: SEFSC-SSRG Socioeconomic Panel v.4 July 2017.
[1]Gears include: Longlines and buoy gear (longline), bandit, diving gear, hook-and-line, and others (pots/traps, nets, others).

[25] http://sero.nmfs.noaa.gov/sustainable_fisheries/lapp_dm/index.html

Commercial Sector Business Activity

Estimates of the business activity (economic impacts) in the U.S. associated with the commercial harvests of Gulf reef fish and certain species complexes were derived using the model developed for and applied in NMFS (2015) and are provided in Table 3.4.3.7. Business activity for the commercial sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), income impacts (wages, salaries, and self-employed income), and value added impacts (difference between the sales price of a good and the cost of the goods and services needed to produce it). Income impacts should not be added to output (sales) impacts because this would result in double counting. The estimates of economic activity include the direct effects (effects in the sector where an expenditure is actually made), indirect effects (effects in sectors providing goods and services to directly affected sectors), and induced effects (effects induced by the personal consumption expenditures of employees in the directly and indirectly affected sectors).

Table 3.4.3.7. Average annual business activity (thousand 2016 dollars) associated with the harvests of vessels that harvested reef fish in the Gulf, 2010-2016. Dollar values are in thousand 2016 dollars.

Species	Average Annual Dockside Revenue	Jobs	Output (Sales) Impacts	Income Impacts	Value Added Impacts
Reef fish	$52,129	6,959	$516,957	$189,845	$268,229
Snappers	$26,438	3,529	$262,185	$96,284	$136,038
Groupers	$23,678	3,161	$234,812	$86,231	$121,834
Tilefishes	$1,112	149	$11,032	$4,051	$5,724
Jacks	$675	90	$6,696	$2,459	$3,474
All species[1]	$54,949	7,336	$544,926	$200,116	$282,741

Source: Revenue data from SEFSC-SSRG Socioeconomic Panel v.4 July 2017 and economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).
[1]Includes dockside revenues and economic activity associated with the average annual harvest of all species, including reef fish, harvested by vessels that harvested reef fish in the Gulf.

In addition to the business activities generated by commercial vessel landings of reef fish or certain species groups, business activities associated with commercial vessel landings of all other species landed by commercial vessels are also presented in the tables above. Vessels that harvested reef fish or a species group also harvested other species on trips where reef fish or a species group were harvested. Some vessels took other trips in the Gulf on which no reef fish were harvested, as well as trips in the South Atlantic. All revenues from all species harvested on all of these trips contributed towards making these vessels economically viable and contribute to the economic activity associated with these vessels.

Dealers

Commercial vessels landing reef fish can only sell their catch to seafood dealers with valid Gulf and South Atlantic Dealer (GSAD) permits. On March 3, 2017, there were 412 dealers with valid GSAD permit. There are no income or sales requirements to acquire a GSAD permits. As a result, the total number of dealers can vary over the course of the year and from year to year.

Imports

Information on the imports of all snapper and grouper species, either fresh or frozen, are available at the NOAA website.[26] Information on the imports of individual snapper or grouper species, including golden tilefish, is not available. In 2016, imports of all snapper and grouper species (fresh and frozen) were approximately 57.20 million pounds valued at approximately $176.86 million. The dominance of imports is apparent when contrasted with reef fish landings in the Gulf of approximately 15.21 million pounds, with an ex-vessel value of approximately $60.25 million, in 2016.

Recreational Sector

Angler Effort

Recreational effort derived from the Marine Recreational Information Program (MRIP) database can be characterized in terms of the number of trips as follows:

- Target effort – The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or second primary target for the trip. The species did not have to be caught.
- Catch effort – The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
- Total recreational trips – The total estimated number of recreational trips in the Gulf, regardless of target intent or catch success.

Other measures of effort are possible, such as directed trips (the number of individual angler trips that either targeted or caught a particular species). Estimates of the number of reef fish target trips and catch trips for the shore, charter, and private/rental boat modes in the Gulf for 2010-2016 are provided in Table 3.4.3.8. Florida has the highest number of target and catch trips for reef fish, followed by Alabama. The other two states show much lower number of target and catch trips for reef fish, but nonetheless are not negligible. Over the period examined, reef fish were most commonly targeted by private/rental anglers, and average reef fish target effort totaled approximately 1.37 million trips per year across all modes. Although more trips caught reef fish that targeted reef fish, approximately 2.85 million trips per year from all modes, the difference between target and catch trips is not substantially large.

[26] http://www.st.nmfs.noaa.gov/st1/trade/cumulative_data/TradeDataProduct.html

The for-hire sector is comprised of charter vessels and headboats (party boats). Although charter vessels tend to be smaller, on average, than headboats, the key distinction between the two types of operations is how the fee is determined. On a charter boat trip, the fee charged is for the entire vessel, regardless of how many passengers are carried, whereas the fee charged for a headboat trip is paid per individual angler.

Similar analysis of recreational effort is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler days, or the number of standardized 12-hour fishing days that account for the different half-, three-quarter-, and full-day fishing trips by headboats. The stationary "fishing for demersal (bottom-dwelling) species" nature of headboat fishing, as opposed to trolling, suggests that most, if not all, headboat trips and, hence, angler days, are demersal or reef fish trips by intent. Estimates of headboat effort (angler days) are provided in Table 3.4.3.9. Headboat data are collected by the NMFS Southeast Region Headboat Survey (SRHS).

Table 3.4.3.8. Average (2010-2016) number of reef fish recreational target and catch trips, by mode and by state.

	Shore Mode	Charter Mode	Private/Rental Mode	All Modes
		Target Trips		
Alabama	5,440	21,564	125,254	152,257
Florida	153,990	120,013	894,790	1,168,793
Mississippi	nr	5,594	30,365	35,959
Louisiana[1]	nr	315	15,191	15,506
Total	159,429	147,487	1,065,599	1,372,515
		Catch Trips		
Alabama	15,634	46,320	159,184	221,138
Florida	495,809	356,192	1,678,604	2,530,605
Mississippi	4,960	9,182	58,243	72,385
Louisiana	2,722	593	30,688	34,002
Total	519,124	412,287	1,926,719	2,858,130

Source: MRIP database, NMFS, SERO.
nr = none recorded;. averages based on positive entries; "nr" entries are not assumed equivalent to "0" trips; Texas is not covered in the MRFSS/MRIP, so no target or catch trips are available for the state.
[1]Target and catch trips for Louisiana do not include data from the Louisiana Creel Survey.

Table 3.4.3.9. Headboat angler days and percent distribution, by state, 2011-2015.

	Angler Days				Percent Distribution			
	FLW	NWFL-AL[1]	MS-LA[2]	TX	FLW	NWFL-AL	MS-LA	TX
2010	70,424	40,594	715	47,1	44.3%	25.5%	0.5%	29.7%
2011	79,722	77,303	3,657	47,2	38.3%	37.2%	1.8%	22.7%
2012	84,205	77,770	3,680	51,7	38.7%	35.8%	1.7%	23.8%
2013	94,752	80,048	3,406	55,7	40.5%	34.2%	1.5%	23.8%
2014	102,84	88,524	3,257	51,2	41.8%	36.0%	1.3%	20.8%
2015	107,91	86,473	3,587	55,1	42.6%	34.2%	1.4%	21.8%
2016	109,09	90,875	2,952	54,0	42.5%	35.4%	1.1%	21.0%
Average	92,707	77,370	3,036	51,7	41.2%	34.4%	1.4%	23.0%

Source: NMFS Southeast Region Headboat Survey (SRHS).
[1]Beginning in 2013, SRHS data was reported separately for NW Florida and Alabama, but has been combined here for consistency with previous years.
[2]Headboats from Mississippi and Louisiana are combined for confidentiality purposes.

Permits

A federal charter/headboat (for-hire) vessel permit is required for fishing in federal waters for Gulf reef fish. On March 3, 2017, there were 1,179 vessels with a valid (non-expired) or renewable Gulf for-hire reef fish permit (including historical captain permits). A renewable permit is an expired limited access permit that may not be actively fished, but is renewable for up to one year after expiration. The Gulf reef fish for-hire permits are limited access permits. Most for-hire vessels possess more than one for-hire permit.

Although the for-hire permit application collects information on the primary method of operation, the permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, if a vessel meets certain selection criteria used by the SRHS and is selected to report by the Science Research Director (SRD) of the SEFSC, it is determined to operate primarily as a headboat and is required to submit harvest and effort information to the SRHS. As of February 2017, 73 Gulf headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.).

Information on Gulf charter vessel and headboat operating characteristics is included in Savolainen et al. (2012) and is incorporated herein by reference. The average charter vessel operation took 46 full-day (9 hours) and 55 half-day (5 hours) trips per year, carried 4.8 and 4.6 passengers per trip type, respectively, targeted reef fish and pelagic species on 64% and 19% of all trips, respectively, and took 68% of all trips in the EEZ. The average headboat operation took 83 full-day (10 hours) and 37 half-day (6 hours) trips per year, carried 13.1 and 14.6 passengers per trip type, respectively, targeted reef fish and pelagic species on 84% and 6% of all trips, respectively, and took 81% of all trips in the EEZ.

There are no specific federal permitting requirements for recreational anglers to fish for or harvest reef fish. Instead, anglers are required to either possess a state recreational fishing permit that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. For the for-hire sector, customers are authorized to fish under the charter or headboat vessel license and are not required to hold their own fishing licenses. As a result, it is not possible to identify with available data how many individual anglers would be expected to be affected by this amendment.

Economic Value

Economic value can be measured in the form of consumer surplus (CS) per additional fish kept on a trip for anglers (the amount of money that an angler would be willing to pay for a fish in excess of the cost to harvest the fish). The CS value per fish for all reef fish species or species complex is unknown but a proxy may be used to approximate the CS per fish. Haab et al. (2012) estimated a CS for an additional snapper caught and kept of $12.25 (2016 dollars), with bounds of $8.17 and $17.69 at the 95% confidence interval.

Economic value for for-hire vessels can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. For vessels in the Gulf, the estimated NOR value is $155 (2016 dollars) per charter angler trip (Liese and Carter 2011). The estimated NOR value per headboat angler trip is $54 (2016 dollars) (C. Liese, NMFS SEFSC, pers. comm.).

Business Activity

Recreational fishing generates economic activity as consumers spend their income on various goods and services needed for recreational fishing. This spurs economic activity in the region where recreational fishing occurs. It should be clearly noted that, in the absence of the opportunity to fish, the income would presumably be spent on other goods and services and these expenditures would similarly generate economic activity in the region where the expenditure occurs. As such, the analysis below represents a distributional analysis only.

Estimates of the business activity (economic impacts) associated with recreational angling for reef fish were derived using average impact coefficients for recreational angling for all species, as derived from an add-on survey to the Marine Recreational Fisheries Statistics Survey (MRFSS) to collect economic expenditure information, as described and utilized in NMFS (2016). Estimates of the average expenditures by recreational anglers are also provided in NMFS (2016) and are incorporated herein by reference.

Recreational fishing generates business activity (economic impacts). Business activity for the recreational sector is characterized in the form of full-time equivalent jobs, output (sales) impacts (gross business sales), income impacts, and value-added impacts (difference between the value of goods and the cost of materials or supplies). Estimates of the average reef fish target effort (2010-2016) and associated business activity (2016 dollars) are provided in Table 3.4.3.10. The average annual target effort for reef fish over the period 2010-2016 supported an estimated 970 jobs in Florida and generated approximately $115.6 million in output (sales) impacts, $65.4

million in value added impacts, and $41.0 million in income impacts. The corresponding numbers for the other states are: 181 jobs, $20.1 million in output impacts, $10.5 million in value added impacts, and $6.7 million in income impacts in Alabama; 29 jobs, $3.5 million in output impacts, $1.6 million in value added impacts, and $1.1 million in income impacts in Mississippi; 9 jobs, $1.2 million in output impacts, $0.6 million in value added impacts, and $0.3 million in income impacts in Louisiana.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in the MRFSS/MRIP, so, in addition to the absence of estimates of target effort, estimation of the appropriate business activity coefficients for headboat effort has not been conducted. For the same reason, estimation of business activity for Texas has not been conducted.

Table 3.4.3.10. Summary of reef fish target trips (2010-2016 average) and associated business activity. Dollar values are in thousand 2016 dollars. Output, value added, and income impacts are not additive.

	Impacts			
	Florida	**Alabama**	**Mississippi**	**Louisiana**
	Shore Mode	**Shore Mode**	**Shore Mode**	**Shore Mode**
Target Trips	153,990	5,440		
Value Added Impact	$2,549	$196		
Output Impact	$4,197	$354		
Income Impact	$1,459	$116		
Jobs	41	4		
	Private/Rental Mode	**Private/Rental Mode**	**Private/Rental Mode**	**Private/Rental Mode**
Target Trips	894,790	125,254	30,365	15,191
Value Added Impact	$19,732	$3,477	$428	$536
Output Impact	$33,299	$6,716	$986	$1,105
Income Impact	$11,442	$2,019	$256	$290
Jobs	304	67	8	8
	Charter Mode	**Charter Mode**	**Charter Mode**	**Charter Mode**
Target Trips	120,013	21,564	5,594	315
Value Added Impact	$43,139	$6,830	$1,258	$98
Output Impact	$78,190	$13,080	$2,536	$170
Income Impact	$28,160	$4,663	$873	$66
Jobs	626	110	21	1
	All Modes	**All Modes**	**All Modes**	**All Modes**
Target Trips	1,168,793	152,258	35,959	15,506
Value Added Impact	$65,421	$10,503	$1,686	$634
Output Impact	$115,685	$20,150	$3,521	$1,275
Income Impact	$41,061	$6,798	$1,129	$355
Jobs	970	181	29	9

Source: Effort data from the MRIP, economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

3.4.4 Highly Migratory Species Fishery

Commercial Sector

More detailed information on the highly migratory species (HMS) fishery is found in HMS SAFE reports[27], and is incorporated herein by reference. The proposed HAPCs are most likely

[27] https://www.fisheries.noaa.gov/content/atlantic-hms-stock-assessment-and-fisheries-evaluation-reports

to affect the shark fishery, particularly the bottom longline segment. Thus, the focus of the following discussion relates to the shark fishery, unless otherwise noted.

Permits

There are several commercial permits for harvesting HMS. Prominent among these are the directed and incidental shark permits, directed, incidental and handgear swordfish permits, and tuna longline permits. All of these are limited access permits. There are also open access permits, namely the general commercial swordfish permit, commercial smoothhound shark permit, and tuna general category permits. The nature and uses of these permits are described in the 2017 HMS SAFE report. From 2012 through 2017, shark permits in the Gulf averaged 142 per year for directed permits and 174 per year for incidental permits. Florida and Louisiana accounted for most of the shark permits. For the same period, tuna longline permits in the Gulf averaged 133 per year, with Florida and Louisiana accounting for most of the permits. Also, for the same period, swordfish permits in the Gulf averaged 98 per year for directed permits, 40 per year for incidental permits, and 51 per year for handgear permits. In 2017, there were 15 smoothhound shark permits, 89 general commercial swordfish permits, and 238 tuna general category permits. While Florida accounted for the most number of permits, all other Gulf states reported at least one type of open access permits. Among these permitted vessels, shark vessels are the ones very likely to be affected by the current amendment. It is noted that the count of Gulf permits includes the east coast of Florida.

Shark Vessel Revenue

Table 3.4.4.1 contains information on vessel count and revenue for active commercial shark vessels that harvested sharks in the Gulf from 2013-2017. Revenue values were generated using landings and price information from the HMS Electronic Dealer reports from 2013-2017

Based on HMS Electronic Dealer reports for shark landings in the Gulf in 2017 and the list of vessels with limited access shark permits, 18 vessels were active in the Gulf in 2017. These vessels landed $4.7 million (2017 dollars) of HMS in 2017. The total annual revenue from HMS for these vessels averaged $4.8 million per year from 2013 to 2017. This indicates that 2017 revenues were consistent with the 5-year average. The average revenue per vessel for these 18 vessels was $266,270 per vessel per year from 2013 to 2017.

Of the 18 vessels that were actively fishing sharks in the Gulf in 2017, 11 had both a shark limited access permit and a reef fish and/or shrimp Gulf permit. These vessels generated $9.9 million in revenue from 2013 to 2017, which is an average of $1.9 million in total revenue per year. The 2017 revenue for these vessels was $2.1 million, which is very close to the average revenue during the past five years. While revenue has fluctuated from a low in 2015 to a high in 2013, there is no discernible trend over this period.

There were seven other vessels that were actively fishing sharks in the Gulf with a shark limited access permit and no other Gulf permits in 2017. These vessels generated $14.0 million in revenue from 2013 to 2017, which is an average of $2.8 million in total revenue per year. The revenue for these vessels in 2017 was $2.6 million, which is very close to the average revenue over the past five years. While revenue has fluctuated from a low in 2015 to a high in 2013, there is no discernible trend over this period for these vessels that only held shark limited access permits and no other Gulf permits.

Table 3.4.4.1. Summary of revenue (2017 dollars) by year from those active vessels landing at least one shark with both a commercial shark limited access permit and reef fish and/or federal Gulf shrimp permit, and vessels with only a commercial shark limited access permit in 2013-2017.

Year	Revenue for Vessels that have both a Shark Limited Access Permit and a Reef Fish/Federal Gulf Shrimp Permit (11 vessels)	Revenue for Vessels that only have a Shark Limited Access Permit (7 vessels)	Total
2013	$2,362,114	$3,678,009	$6,040,123
2014	$2,105,362	$3,042,433	$5,147,795
2015	$1,602,484	$2,066,867	$3,669,351
2016	$1,791,576	$2,633,678	$4,425,253
2017	$2,099,708	$2,618,080	$4,717,788
Total	$9,961,243	$14,039,067	$24,000,310
Average	$1,992,249	$2,807,813	$4,800,062

Business Activity

Average vessel revenues reported in Table 3.4.4.1 are used in generating the associated business activity shown in Table 3.4.4.2. Thus, the estimated business activity would be an underestimate of business activity associated with commercial landings of all HMS in the Gulf.

Table 3.4.4.2. Average annual business activity associated with the harvests of vessels that harvested sharks in the Gulf, 2013-2017. Dollar values are in thousand 2017 dollars.

Species	Average Annual Dockside Revenue	Jobs	Output (Sales) Impacts	Income Impacts	Value Added Impacts
HMS	$4,800	626	$47,733	$17,399	$24,676

Source: Revenue data from SEFSC-SSRG Socioeconomic Panel v.4 July 2017 and economic impact results calculated by NMFS SERO using the model developed for NMFS (2016).

Dealers

As of October 1, 2018, there were 40 shark and 106 swordfish dealers located in the Gulf (including the east coast of Florida). NMFS does not currently have specific information regarding the costs and revenues for Atlantic HMS dealers. In general, dealer costs include: purchasing fish; paying employees to process the fish; rent or mortgage; and supplies to process the fish. Some dealers may provide loans to the vessel owner, money for vessel repairs, fuel, ice, bait, etc. In general, outlays and revenues of dealers are not as variable or unpredictable as those of a vessel owner; however, dealer costs may fluctuate depending upon supply of fish, labor costs, and equipment repair.

Imports

Information on the imports of all sharks, tuna, and swordfish are available at the NOAA. Website.[27,28] Information on the imports of individual shark species is relatively limited. In 2017, imports of sharks (fresh and frozen), including shark fins were approximately 916,000 lbs valued at approximately $1.95 million; tuna imports of various product forms were approximately 578 mp valued at $1.6 billion; and, swordfish imports were approximately 25.2 mp valued at $87.7 million.

Recreational Sector

Permits

Permit requirements for the HMS recreational sector are different from those of other species in the Gulf in that federal recreational permits for most species in the Gulf apply to the for-hire sector. For HMS, permits are required for for-hire vessels and private anglers. In 2017, there were 924 HMS charter/headboat permits and 5,942 private angling permits for the Gulf states, inclusive of the Florida east coast.

[28] https://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/index

Harvests

Recreational harvests of sharks were predominantly large and small coastal sharks (Table 3.4.4.3). The data shown in the table already takes into account the harvest prohibition on a number of shark species. For recreational harvest of other HMS species, see the 2017 HMS Safe report.

Table 3.4.4.3. Estimated Gulf recreational harvest of various species groups of sharks, in numbers of fish, 2012-2016.

Species Group	2012	2013	2014	2015	2016	Average
Large coastal sharks	46,492	134,351	17,525	12,583	18,401	45,870
Pelagic sharks*	1,328	11,033	23,149	35,000	10,789	16,260
Small coastal sharks	49,949	53,843	48,943	36,679	43,062	46,495
Smoothhound sharks*	1,258	214	7	3	3	297
Total	99,027	199,441	89,624	84,265	72,255	108,922

Source: 2017 HMS SAFE report.
*Harvest of pelagic sharks includes Atlantic and U.S Caribbean harvests; harvests of smoothhound sharks include smooth dogfish.

Effort

The two types of fishing effort in the Gulf for various species of sharks are shown in Table 3.4.4.4 for target trips and Table 3.4.4.5 for catch trips. The shark species included are those listed in Table 3.1.4.1. Both the private/rental mode and shore mode show relatively high level of effort. Similar to many fish species in the Gulf, catch trips far outnumber target trips.

Table 3.4.4.4. Target trips for various species of sharks, 2012-2017 average.

	Shore	Charter	Private/Rental	Total
Alabama	6,273	0	585	6,858
Florida	14,432	951	26,677	42,059
Louisiana	229	0	0	229
Mississippi	7,534	8	714	8,256
Total	28,467	958	27,976	57,401

Source: MRIP database, NMFS, SERO.

Table 3.4.4.5. Catch trips for various species of sharks, 2012-2017 average.

	Shore	Charter	Private/Rental	Total
Alabama	27,173	2,709	43,051	72,933
Florida	105,252	27,891	286,016	419,160
Louisiana	11,926	1,619	14,574	28,119
Mississippi	1,718	4,793	16,562	23,073
Total	146,069	37,012	360,203	543,285

Source: MRIP database, NMFS, SERO.

Expenditures and Economic Activity

HMS anglers in the Southeast (North Carolina to Texas) were found to spend $29,532 on average for durable goods and services related to marine recreational fishing, of which $15,296 could be attributed to HMS angling (based on their ratio of HMS trips to total marine angling trips). The largest expenditures items for marine angler durable goods among HMS anglers were for new boats ($8,954), used boats ($6,579), boat maintenance ($3,028), boat storage ($1,813), and rods and reels ($1,608). HMS anglers were estimated to have spent a total of $108 million on durable goods for HMS angling which in turn were estimated to generate $152 million in economic output, and support 1,331 jobs from North Carolina to Texas in 2014 (Lovell et al. 2016).

3.5 Description of the Social Environment

This amendment affects the coral fishery in federal waters in the Gulf, as well as fishermen and communities associated with fisheries in the Gulf, particularly the shrimp and reef fish fisheries.

This section includes a description of the coral fishery in the Gulf and permits and endorsements related to the commercial shrimp fishing and commercial and recreational reef fish fishing. Permits and endorsements are presented by state in order to provide a geographic distribution of fishing involvement. Top communities based on the number of permits and endorsements are presented.

In addition, descriptions of communities include information about the top communities based on a 'regional quotient' (RQ) of commercial landings and value for shrimp or reef fish. The RQ is the proportion of landings and value out of the total landings and value of that species for that region, and is a relative measure. These communities would be most likely to experience the effects of the proposed actions that could change the shrimp and reef fish fisheries and impact participants, associated businesses, and communities within the region. If a community is identified as a shrimp or reef fish community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species was also important to the local community and economy. Additional detailed information about communities with the highest RQs can be found for Gulf communities on the Southeast Regional Office (SERO)'s Community Snapshots website.[29]

Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

3.5.1 Corals

[29] http://sero.nmfs.noaa.gov/sustainable_fisheries/social/community_snapshot/

As described in Section 3.1.1, black coral and stony coral are the only corals managed under the Gulf Council Coral FMP and harvests are prohibited in the Gulf EEZ. In addition, live rock is part of the FMP, but harvest of wild live rock is prohibited in the Gulf and a federal live rock permit is required to harvest aquacultured live rock in the Gulf and South Atlantic EEZ. As of March 4, 2018, there were 13 aquacultured live rock permits issued and all permits were issued to individuals residing in Florida (SERO permit office). However, the harvest of aquacultured live rock is not known to occur in the proposed HAPC areas and thus aquacultured live rock permits holders are not described in detail here.

3.5.2 Shrimp

Commercial

As described in Section 3.1.2, shrimp gears include but are not limited to cast nets, haul seines, stationary butterfly nets, wing nets, skimmer nets, traps, beam trawls, and otter trawls.

As of August 23, 2017, there were 1,429 federally-permitted Gulf shrimp vessels (SERO permit office). Gulf shrimp permits are issued to individuals in Texas (approximately 38% of Gulf shrimp vessels), Louisiana (approximately 27%), Florida (14%), Alabama (7.4%), and Mississippi (approximately 7%, SERO permit office, August 23, 2017). Residents of other states (Alaska, California, Georgia, Hawaii, Massachusetts, Michigan, Minnesota, North Carolina, New Jersey, New Mexico, New York, Oklahoma, South Carolina, Tennessee, and Virginia) also hold commercial shrimp permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf shrimp permits are held by individuals with mailing addresses in 245 communities (SERO permit office, August 23, 2017). Communities with the most commercial shrimp permits are located in all Gulf states (Table 3.5.2.1). The communities with the most shrimp permits are Brownsville, Texas (5.9% of shrimp permits), Port Isabel, Texas (5.1%), and Palacios, Texas (4.8%).

The top shrimp communities ranked by pounds of commercial landings are dominated by Texas and Louisiana communities. However Bayou La Batre, Alabama, ranks first in terms of pounds of overall shrimp landings (brown, white, pink, royal red, rock, and seabob, Figure 3.5.2.1). Palacios, Texas, ranks second in terms of value RQ for total shrimp, and Chauvin, Louisiana is third. Many Louisiana communities have a lower RQ for value, which indicates lower prices for smaller shrimp in most cases.

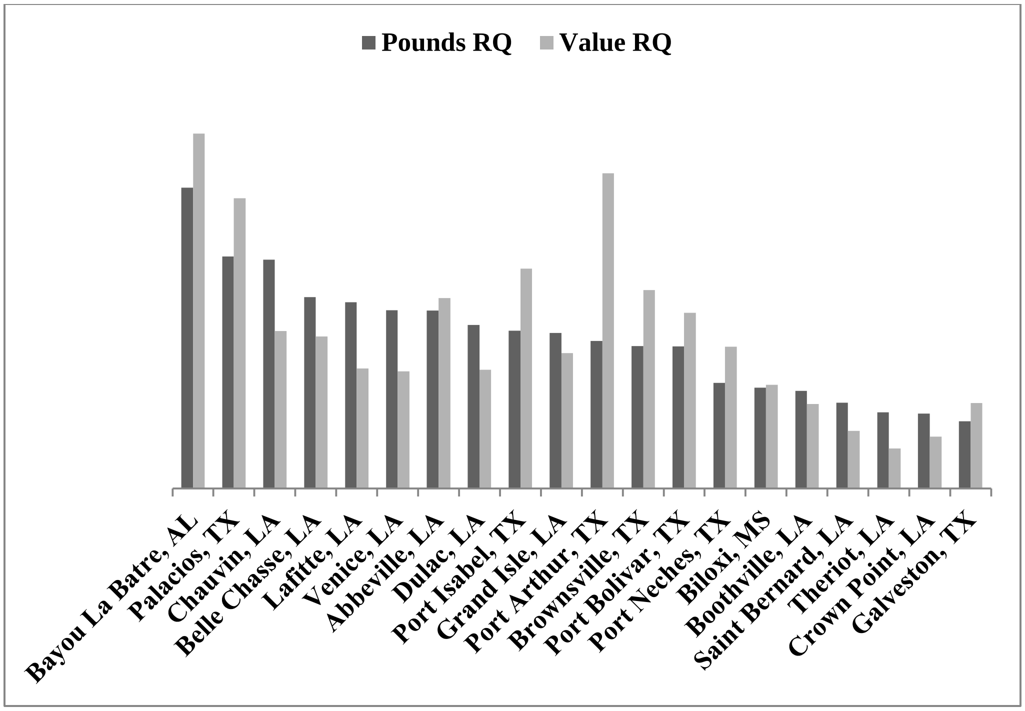

Figure 3.5.2.1. Top 20 Gulf communities ranked by pounds and value RQ for total shrimp. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

A valid Gulf shrimp permit is required for a Gulf royal red shrimp endorsement. As of August 23, 2017, there were 291 federally-endorsed Gulf royal red shrimp vessels (SERO permit office). Gulf royal red shrimp endorsements are issued to individuals in Texas (36%), Florida (16%), Alabama (14%), Louisiana (13.8%), North Carolina (approximately 9%), and Mississippi (approximately 5%, SERO permit office, August 23, 2017). Residents of other states (California, Georgia, Massachusetts, New Jersey, and Virginia) also hold royal red shrimp endorsements, but these states represent a smaller percentage of the total number of issued permits.

Royal red shrimp endorsements are held by individuals with mailing addresses in 88 communities (SERO permit office, August 23, 2017). Communities with the most royal red shrimp endorsements are located in all Gulf states, as well as North Carolina and Virginia (Table 3.5.2.1). The communities with the most royal red shrimp endorsements are Brownsville, Texas (15.1% of royal red endorsements), Port Isabel, Texas (11.7%), and Bayou La Batre, Alabama (5.5%).

Gulf royal red shrimp is landed primarily in Alabama and Florida (Figure 3.5.2.2). Royal red shrimp is also landed in Texas and Louisiana, but communities in these states represent a smaller proportion of the total landings. The communities of Bon Secour, AL; Port St. Joe, FL; and Bayou La Batre, AL are the top ports in terms of commercial landings.

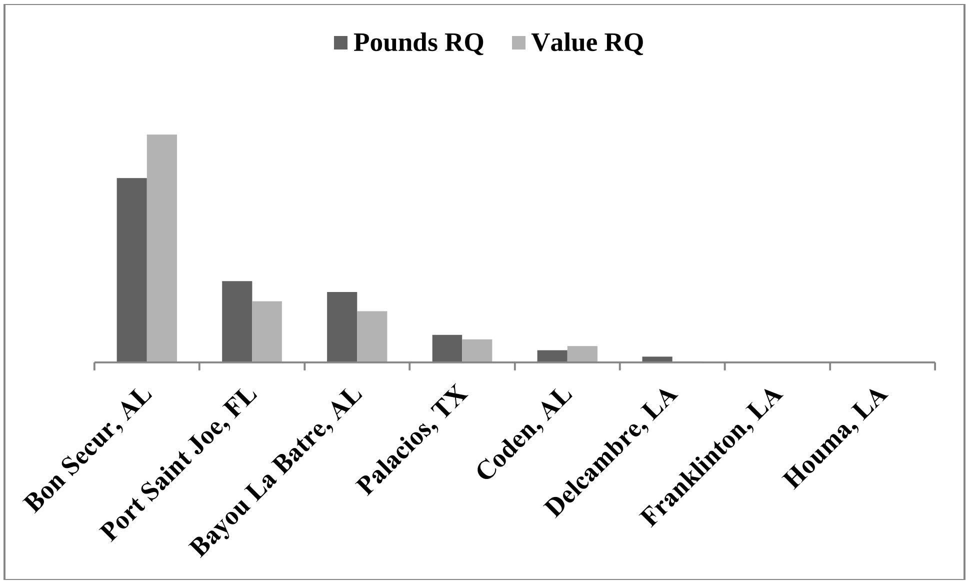

Figure 3.5.2.2. All Gulf communities ranked by pounds and value RQ for royal red shrimp. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

Table 3.5.2.1. Top communities by number of Gulf shrimp permits and Gulf royal red shrimp endorsements.

State	Community	Shrimp Permits (SPGM)	State	Community	Royal Red Shrimp Endorsements (GRRS)
TX	Brownsville	84	TX	Brownsville	44
TX	Port Isabel	73	TX	Port Isabel	34
TX	Palacios	69	AL	Bayou La Batre	16
LA	Chauvin	42	NC	Oriental	14
TX	Houston	38	FL	Fort Meyers Beach	13
LA	Cut Off	36	AL	Irvington	9
TX	Port Lavaca	33	FL	Jacksonville	9
AL	Bayou La Batre	30	LA	Chauvin	7
FL	Fort Meyers Beach	29	FL	Pensacola	6
TX	Port Arthur	28	AL	Mobile	5
AL	Mobile	25	LA	Abbeville	5
TX	Nederland	25	MS	Ocean Springs	5
LA	Abbeville	24	NC	New Bern	5
MS	Biloxi	24	VA	Newport News	5
LA	Houma	23	NC	Hobucken	4
LA	New Orleans	23			

Source: SERO permit office, August 23, 2017.

3.5.3 Reef Fish

Commercial

As described in Section 3.1.3, primary commercial gears in the reef fish fishery include vertical lines including handlines and bandit gear and bottom longlines; however, the primary harvest method for some species (i.e. hogfish) is spearfishing.

As of August 23, 2017, there were 842 federally-permitted commercial Gulf reef fish vessels (SERO permit office). Gulf reef fish permits are issued to individuals in Florida (approximately 79% of Gulf reef fish vessels), Texas (9%), Louisiana (4.6%), Alabama (4.3%), and Mississippi (less than 1%, SERO permit office, August 23, 2017). Residents of other states (California, Georgia, Maine, North Carolina, New Jersey, New York, Ohio, Oregon, South Carolina, and Wisconsin) also hold commercial reef fish permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf reef fish permits are held by individuals with mailing addresses in 220 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida and Texas (Table 3.5.3.1). The communities with the most reef fish permits are Panama City, Florida (approximately 8% of reef fish permits), Key West, Florida (4.4%), and St. Petersburg, Florida (3.4%).

Table 3.5.3.1. Top communities by number of Gulf reef fish permits and Eastern Gulf reef fish bottom longline endorsements.

State	Community	Reef Fish Permits (RR)	State	Community	Eastern Gulf Reef Fish Bottom Longline Endorsements (RRLE)
FL	Panama City	67	FL	Seminole	8
FL	Key West	37	FL	Cortez	7
FL	St. Petersburg	29	FL	Largo	6
FL	Largo	23	FL	Lecanto	4
TX	Galveston	23	FL	Palm Harbor	4
FL	Destin	19	FL	St. Petersburg	4
FL	Pensacola	19	FL	Indian Shores	3
FL	Seminole	18	FL	Panama City	3
FL	Cortez	17			
FL	Apalachicola	15			
FL	Clearwater	14			
TX	Corpus Christi	14			
FL	Naples	13			
FL	Fort Meyers	12			
FL	Steinhatchee	12			
FL	Tarpon Springs	12			

Source: SERO permit office, August 23, 2017.

A valid Gulf reef fish commercial permit is required for a commercial Eastern Gulf reef fish bottom longline endorsement. As of August 23, 2017, there were 62 federally-endorsed commercial Eastern Gulf reef fish bottom longline vessels (SERO permit office). Nearly all Eastern Gulf reef fish bottom longline endorsements are issued to individuals in Florida, with one endorsement issued to an individual in Texas. Longline endorsements are held by individuals with mailing addresses in 25 communities, and a large portion of these communities are located in the greater Tampa Bay area in Pinellas County and Manatee County (about 60% of communities with bottom longline endorsements, SERO permit office, August 23, 2017). The communities with the most longline endorsements are Seminole, Florida (approximately 13% of longline endorsements), followed by Cortez, Florida (11.3%), and Largo, Florida (9.7%; Table 3.5.3.1).

The top reef fish communities ranked by pounds of commercial landings are dominated by Florida communities, though Galveston, Texas, ranks first in terms of pounds of overall reef fish landings (snappers, groupers, tilefishes, jacks, triggerfish, and hogfish, Figure 3.5.3.1). Madeira Beach, Florida, ranks second in terms of value RQ for total reef fish and Panama City, Florida is third.

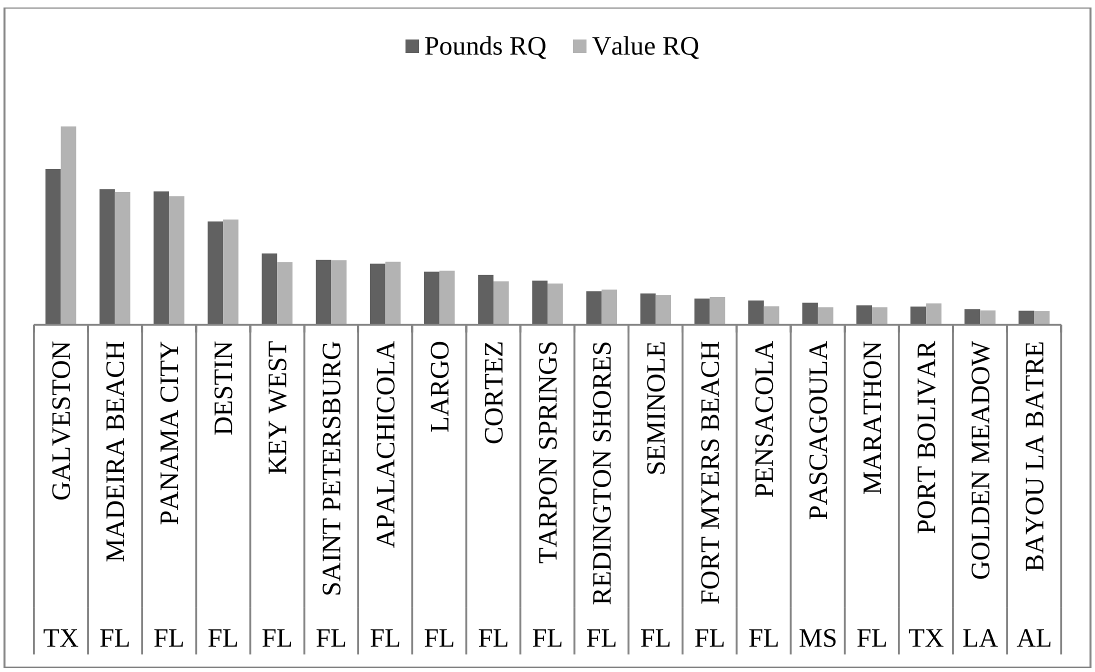

Figure 3.5.3.1. Top 20 Gulf communities ranked by pounds and value RQ for total reef fish. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS 2014.

Recreational

As of August 23, 2017, there were 1,279 federally-permitted charter/headboat for reef fish vessels (SERO permit office). Charter/headboat for reef fish permits are issued to individuals in Florida (approximately 58% of charter/headboat for reef fish vessels), Texas (17.4%), Alabama (10.2%), Louisiana (8.2%), and Mississippi (2.7%, SERO permit office, August 23, 2017).

Residents of other states (Connecticut, Delaware, Georgia, Iowa, Illinois, Maine, Michigan, Montana, North Carolina, New Jersey, New York, Ohio, Oklahoma, Tennessee, Virginia, and Wisconsin) also hold charter/headboat permits, but these states represent a smaller percentage of the total number of issued permits.

Charter/headboat for reef fish permits are held by individuals with mailing addresses in 349 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida, Texas, Alabama, and Louisiana (Table 3.5.3.2). The communities with the most reef fish permits are Destin, Florida (5% of charter/headboat permits), Orange Beach, Alabama (3.8%), and Panama City, Florida (approximately 3.8%).

Table 3.5.3.2. Top communities by number of Gulf charter/headboat for reef fish permits.

State	Community	Charter/Headboat for Reef Fish Permits (RCG)
FL	Destin	64
AL	Orange Beach	49
FL	Panama City	48
FL	Naples	45
FL	Key West	43
FL	Pensacola	26
FL	St. Petersburg	23
TX	Galveston	22
FL	Sarasota	19
TX	Corpus Christi	19
FL	Panama City Beach	18
FL	Clearwater	17
FL	Fort Myers	16
LA	Metairie	16
TX	Houston	16
TX	Port Aransas	16

Source: SERO permit office, August 23, 2017.

As of August 23, 2017, there were 32 federally-permitted historical captain charter/headboat for reef fish vessels (SERO permit office). Historical captain charter/headboat permits are issued to individuals in Florida (approximately 53% of historical captain charter/headboat vessels), Louisiana (19%), Texas (12.5%), Alabama (9.4%), and Mississippi (6.3%, SERO permit office, August 23, 2017).

Historical captain charter/headboat for reef fish permits are held by individuals with mailing addresses in 21 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida, Alabama, Louisiana, and Mississippi

(Table 3.5.3.3). The communities with the most reef fish permits are Naples, Florida, followed by Port St. Joe, Florida, and Orange Beach, Alabama.

Table 3.5.3.3. Top communities by historical captain Gulf charter/headboat for reef fish permits.

State	Community
FL	Naples
FL	Port St. Joe
AL	Orange Beach
FL	Destin
FL	Fort Walton Beach
FL	Panama City
LA	Houma
LA	Metairie
MS	Biloxi

Source: SERO permit office, August 23, 2017.

3.5.4. Highly Migratory Species

The number of recreational and commercial vessels permitted in HMS fisheries around the Gulf total 6,869 and 1,032, respectively (NMFS 2017). The proposed HAPCs are most likely to affect the shark fishery, particularly the bottom longline segment. Thus, the focus of the following discussion relates to the shark fishery, unless otherwise noted.

Commercial

As of December 2017, there were 154 federally-permitted smoothhound shark vessels (SERO Permit Office). The majority (90.3%) of smoothhound shark permits are issued to individuals who reside outside of Gulf states. In 2017, there were 223 federally-permitted directed shark vessels and 269 federally-permitted incidental shark vessels (SERO Permit Office). A large proportion of directed shark permits (33.6%) and incidental shark permits (approximately 35%) are issued to individuals who reside outside of Gulf states. Within Gulf states, the most limited access shark permits are issued to individuals in Florida (52.9% of directed shark permits and 48% of incidental shark permits), followed by Louisiana (10.3% and 11.9%), Texas (1.3% and 4.1%), Alabama (1.8% and 0.7%), and Mississippi (0% and 0.4%, Table 3.5.4.1).

Table 3.5.4.1. Number of HMS commercial permits by Gulf state.

HMS Commercial Permits by Gulf State – 2017								
	Limited Access Commercial Permits							
	Swordfish Permits		Shark Permits	Tunas Longline Permit	General Commercial Swordfish Permit	Commercial Smoothound Shark Permit	Tunas General Category Permits	Total Number of HMS Commercial permits by Gulf State
State	Directed/ Indicental	Handgear	Directed/ Incidental					
FL*	111	51	247	118	72	13	152	**764**
MS	0	0	1	0	2	0	13	**16**
AL	0	0	6	0	9	1	33	**49**
LA	32	1	55	36	6	1	22	**153**
TX	8	0	14	10	0	0	18	**50**
Total Number of HMS Commercial Permits in Gulf states								**1032**

*Includes vessels from the east and west coast of Florida
NMFS 2017 Atlantic HMS SAFE report.

Recreational

In 2017, there were 3,618 federally permitted Atlantic HMS charter/headboat vessels and 20,338 federally-permitted HMS angling vessels (NMFS 2017). The majority of recreational HMS permits (74.4% of charter/headboat permits and 70.8% of angling permits) are issued to individuals who reside outside of Gulf states. Within Gulf states, the most recreational HMS permits are issued to individuals in Florida (17.6% of charter/headboat permits and 19.7% of angling permits), followed by Texas (10.6% and 3.1%), Louisiana (2.5% and 3.1%), Alabama (1.9% and 2.1%), and Mississippi (0.8% and 1.0%, Table 3.5.4.2).

Table 3.5.4.2 Number of HMS recreational permits by Gulf state, 2017.

State	Recreational HMS Permits		
	HMS CHB Permits	HMS Angling Permits	Total Number of HMS Recreational permits by Gulf State
FL*	638	4,016	4,654
MS	29	207	236
AL	67	434	501
LA	92	645	737
TX	98	643	741
Total Number of HMS Recreational Permits in Gulf states			**6,869**

*Includes vessels from the east and west coast of Florida.
Source: NMFS 2017 Atlantic HMS SAFE Report.

Commercial and Recreational Communities

Jepson and Colburn (2013) developed a series of social indicators of vulnerability and resilience for coastal communities of the United States. Commercial and recreational engagement and reliance indicators are presented for Gulf communities selected for having a greater than average number of Atlantic HMS permits associated with them (Figure 3.5.4.1 and Figure 3.5.4.2). Gulf communities are presented because this amendment affects areas in the Gulf; however some fishermen from other areas may be fishing in the Gulf. These indices can be used to asses a coastal community's vulnerability or resilience to potential economic disruptions such as those resulting from drastic changes in fisheries quotas and seasons, or natural and anthropogenic disasters.

For commercial fishing engagement, the analysis used the number of vessels designated commercial by homeport and owner address, value of landings, and total number of commercial permits for each community for all species. Commercial fishing reliance includes the same variables as fishing engagement divided by population to give an indication of the per capita influence of this activity. Recreational fishing engagement is represented by the number of recreational permits and vessels designated as "recreational" by homeport and owners address. Fishing reliance includes the same variables as fishing engagement, divided by population.

Using a principal component and single solution factor analysis, each community receives a factor score for each index to compare to other communities. Factor scores of both engagement and reliance are plotted for each Gulf community with higher than average number of HMS permits. Two thresholds of one and one-half standard deviation above the mean are plotted to help determine a threshold for significance. The factor scores are standardized; therefore, a score above a value of 1 is also above one standard deviation. A score above one-half standard deviation is considered engaged or reliant, with anything above one standard deviation to be very engaged or reliant.

All included Gulf communities demonstrate high levels of commercial engagement and Apalachicola, Florida demonstrates a high level of commercial reliance (Figure 3.5.4.1). All included Gulf communities demonstrate high levels of recreational engagement and reliance (Figure 3.5.4.2).

For more information on the overall economic and social status of HMS fisheries, please see Chapter 6 and Chapter 7 of the 2017 HMS SAFE Report[30].

[30]https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly

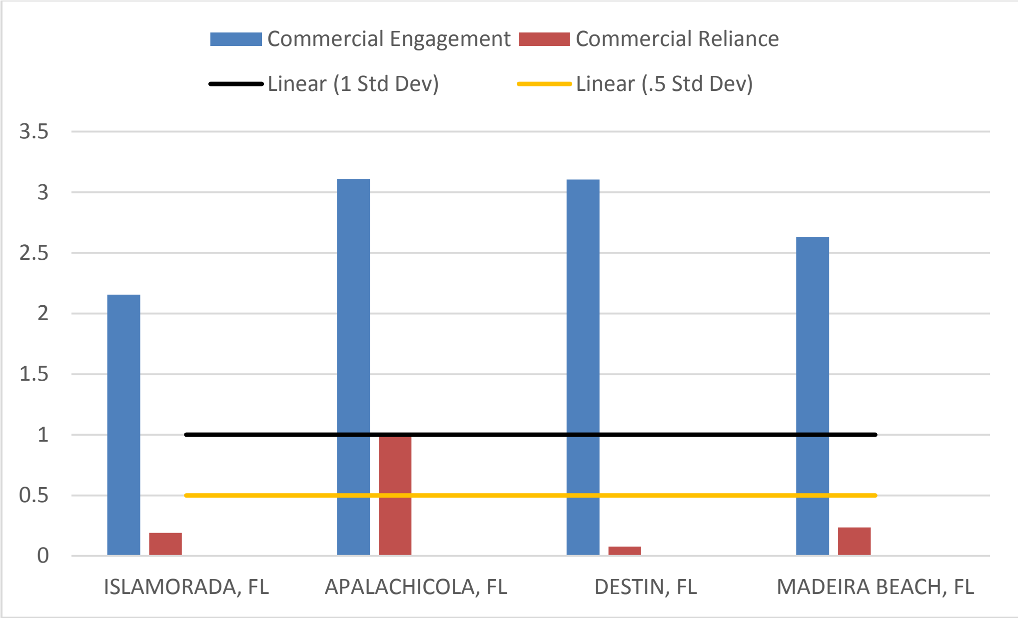

Figure 3.5.4.1. Top Gulf HMS communities' commercial engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

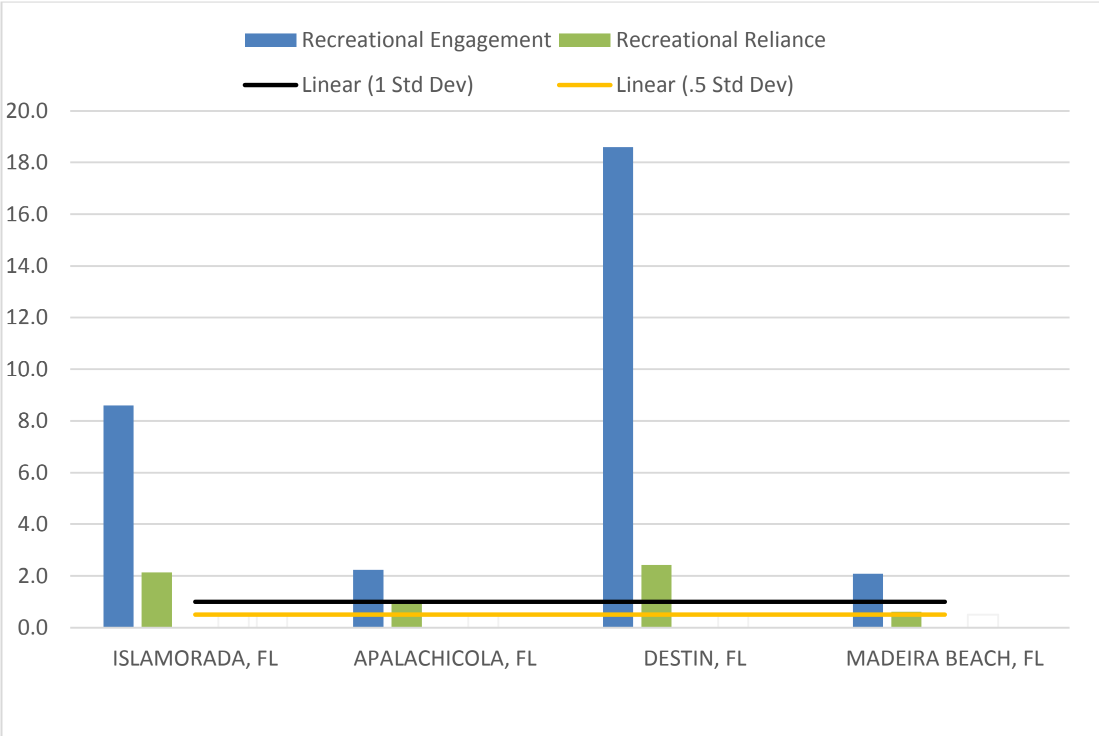

Figure 3.5.4.2. Top Gulf HMS communities' recreational engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

3.5.5 Environmental Justice

Executive Order (E.O.) 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of E.O. 12898 is to consider "the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories…" This E.O. is generally referred to as environmental justice (EJ).

Commercial and recreational harvesters, fishermen, and associated industries could be impacted by the proposed actions. However, information on the race and income status for groups at the different participation levels is not available. Although information is available concerning communities overall status with regard to minorities and poverty (e.g., census data), such information is not available specific to fishermen and those involved in the industries and activities, themselves. To help assess whether any EJ concerns arise from the actions in this amendment, a suite of indices were created to examine the social vulnerability of coastal communities. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and households with children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figures 3.5.5.1 and 3.5.5.2 provide the social vulnerability of the top commercial and recreational shrimp and reef fish communities and the top HMS communities. Several communities exceed the threshold of one standard deviation above the mean for all three indices (Bayou La Batre, Alabama; Brownsville, Texas; Port Arthur, Texas, and Port Isabel, Texas). Several other communities exceed the threshold of one standard deviation above the mean for any of the indices (Fort Myers, Florida; Abbeville, Louisiana; Chauvin, Louisiana; New Orleans, Louisiana; Hobucken, North Carolina; Houston, Texas; Palacios, Texas; and Port Lavaca, Texas). These communities would be the most likely to exhibit vulnerabilities to social or economic disruption due to regulatory change.

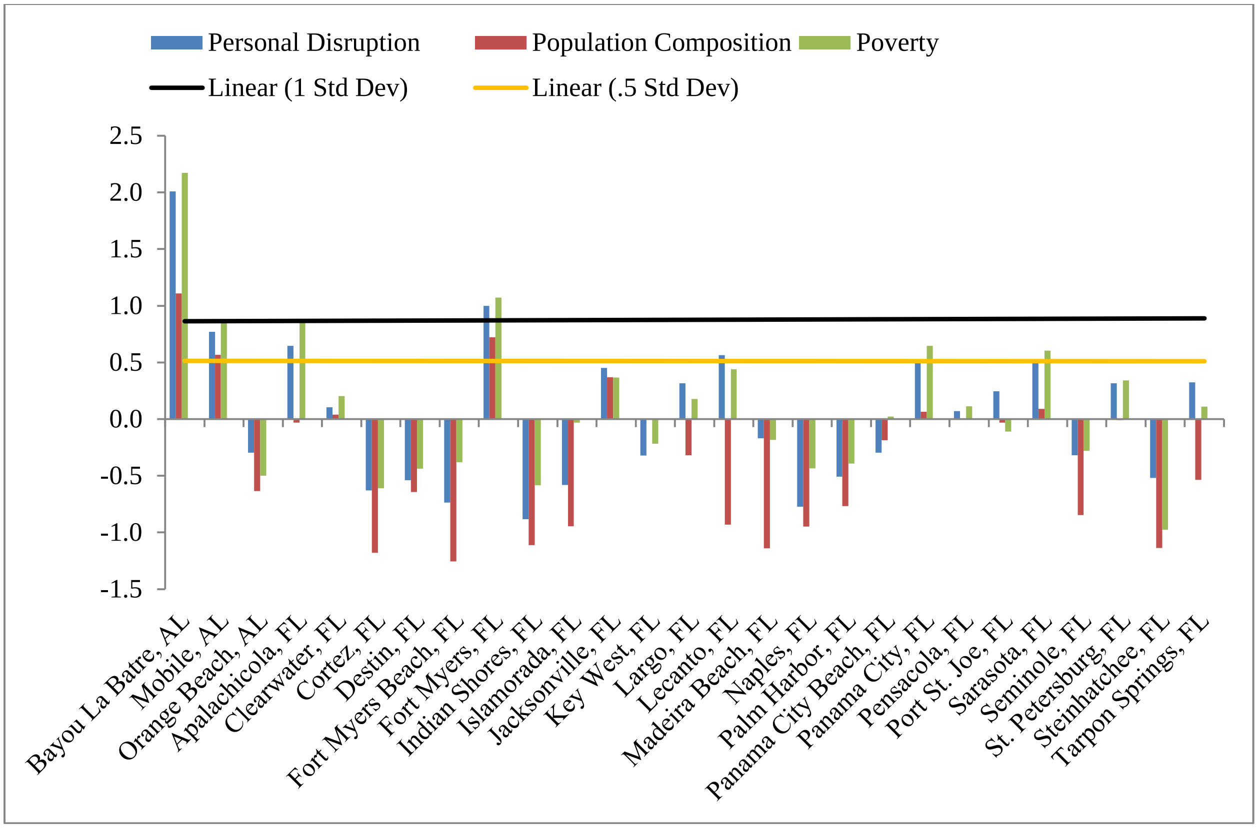

Figure 3.5.5.1. Social vulnerability indices for top commercial and recreational shrimp, reef fish, and HMS communities based on the number of permits and endorsements.
Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

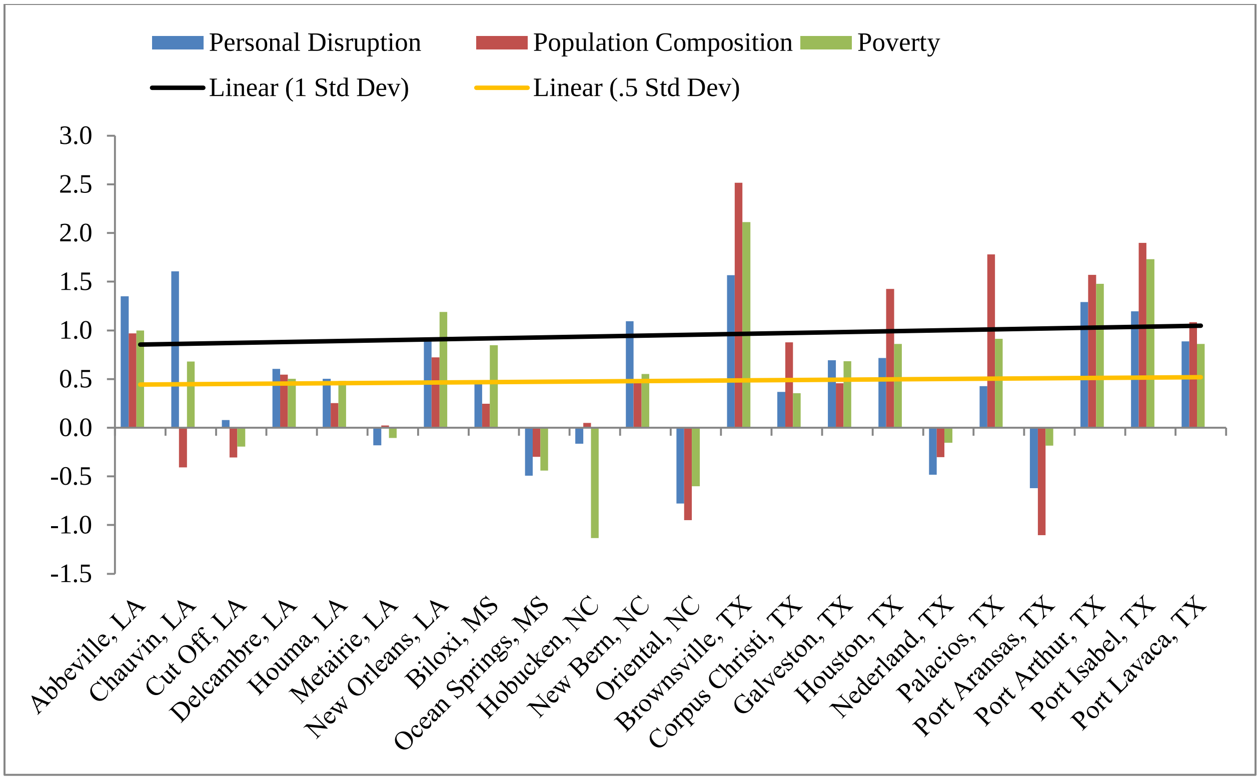

Figure 3.5.5.2. Social vulnerability indices for top commercial and recreational shrimp, reef fish, and HMS communities based on the number of permits and endorsements continued.
Source: SERO, Community Social Vulnerability Indicators Database 2014 (ACS 2010-2014).

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although these communities may have the greatest potential for EJ concerns, data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on shrimp, reef fish, or HMS specifically (participation). Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.6 Description of the Administrative Environment

3.6.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 *et seq*.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the EEZ.

Responsibility for federal fishery management is shared by the Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising FMPs for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in Appendix C. In most cases, the Secretary has delegated this authority to NMFS.

The Council is responsible for fishery resources in federal waters of the Gulf. These waters extend to 200 nautical miles offshore from the seaward boundary of the states Alabama, Florida, Louisiana, Mississippi, and Texas as those boundaries are defined by law. The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline of 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The Council consists of seventeen voting members: 11 public members appointed by the Secretary; one each from the fishery agencies of Texas, Louisiana, Mississippi, Alabama, and Florida; and one from NMFS. The public is also involved in the fishery management process through participation on advisory panels (AP) and through Council meetings that are open to the public. The regulatory process is also in accordance with the Administrative Procedures Act, in the form of "notice and comment" rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of and response to those comments.

Regulations contained within FMPs are enforced through actions of the National Oceanic and Atmospheric Administration's (NOAA) Office of Law Enforcement, the United States Coast Guard, and various state authorities. To better coordinate enforcement activities, federal and state enforcement agencies have developed cooperative agreements to enforce the Magnuson-Stevens Act. These activities are being coordinated by the Council's Law Enforcement Technical Committee and the Gulf States Marine Fisheries Commission's Law Enforcement Committee, which have developed joint enforcement agreements and cooperative enforcement programs.[31]

The U.S. Coast Survey was established in 1807 to provide nautical charts that would help the nation with safe shipping, national defense, and maritime boundaries. The Office of Coast Survey is now an office within NOAA and is responsible for providing navigation products and services that ensure safe and efficient maritime commerce in the Gulf. The Office of Coast Survey maintains the nation's nautical charts and publications which would be responsible for updating current nautical charts with any HAPCs established in these actions.

Atlantic HMS are managed under the dual authority of the Magnuson-Stevens Act and the Atlantic Tunas Convention Act (ATCA). Under the Magnuson-Stevens Act, NMFS must, consistent with ten National Standards, manage fisheries to maintain optimum yield on a continuing basis while preventing overfishing. Under ATCA, the Secretary of Commerce shall promulgate such regulations as may be necessary and appropriate to carry out International Commission for the Conservation of Atlantic Tunas (ICCAT) recommendations. In addition to the Magnuson-Stevens Act, any management measures must also be consistent with other applicable laws including, but not limited to, the National Environmental Policy Act (NEPA), the

[31] www.gsmfc.org

Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and the Coastal Zone Management Act (CZMA).

3.6.2 State Fishery Management

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five Gulf States exercises legislative and regulatory authority over their respective state's natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states' natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources. A more detailed description of each state's primary regulatory agency for marine resources is provided on their respective websites (Table 3.6.2.1).

Table 3.6.2.1. Gulf of Mexico state marine resource agencies and websites.

State marine resource agency	Webpage
Alabama Marine Resource Division	http://www.outdooralabama.com
Florida Fish and Wildlife Conservation Commission	http://myfwc.com
Louisiana Department of Wildlife and Fisheries	http://www.wlf.louisiana.gov
Mississippi Department of Marine Resources	http://www.dmr.ms.gov
Texas Parks and Wildlife Department	http://tpwd.texas.gov

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 Action 1 – Modify Existing HAPC Boundary for Regulations in Pulley Ridge

Pulley Ridge North and Pulley Ridge South were established as habitat areas of particular concern (HAPC) in Generic Essential Fish Habitat (EFH) Amendment 3 in 2005 (GMFMC 2005). In the amendment, a larger rectangle (Pulley Ridge North) was established as an HAPC, but only a small area in the southern portion of the rectangle (Pulley Ridge South) was given fishing regulations (Figure 2.1.1) in order to protect the densest living coral habitat that was known to exist at that time.

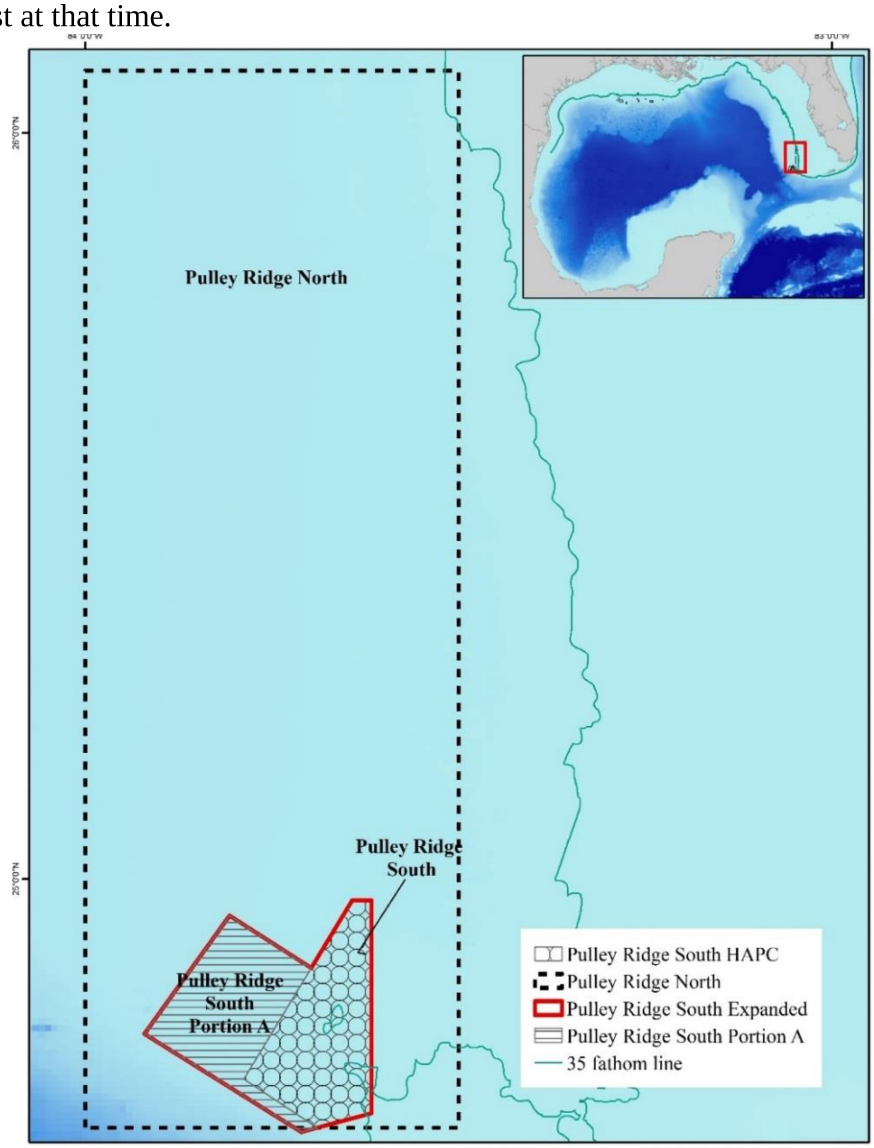

Figure 2.1.1. The existing Pulley Ridge North HAPC, Pulley Ridge South HAPC (with regulations), and the Coral SSC recommended expansion of Pulley Ridge South, labeled Pulley Ridge South Portion A.

Alternative 1: No Action – Do not modify the existing Pulley Ridge South HAPC or change the area subject to fishing regulations. Current regulations to include: fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC (50 CFR 622.74(d)). Pulley Ridge South HAPC is currently bound by the following coordinates (converted from degrees, minutes, seconds to degrees, decimal minutes), connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Depth Range: 162-654 ft (27-109 fathoms) Area: 100.7 nm^2	A	83°38.550’	24°58.300’
	B	83°37.000’	24°58.300’
	C	83°37.000’	24°41.183’
	D	83°41.367’	24°40.000’
	E	83°47.250’	24°43.917’
	A	83°38.550’	24°58.300’

Alternative 2: Expand the fishing regulations for Pulley Ridge South HAPC (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC) to the entire Pulley Ridge North HAPC to be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge North Depth Range: 162-654 ft (27-109 fathoms) Area: 2302.4 nm^2	A	84°00.000’	24°40.000’
	B	84°00.000’	26°05.000’
	C	83°30.000’	26°05.000’
	D	83°30.000’	24°40.000’
	A	84°00.000’	24°40.000’

Alternative 3: Modify the existing Pulley Ridge South HAPC to include Pulley Ridge South Portion A, with the same regulations throughout (fishing with a bottom longline, bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC). The new Pulley Ridge South HAPC will be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Expansion Depth Range: 162-654 ft (27-109 fathoms) Area: 194.2 nm^2	A	83°38.550’	24°58.300’
	B	83°37.000’	24°58.300’
	C	83°37.000’	24°41.183’
	D	83°41.366’	24°40.000’
	E	83°42.648’	24°39.666’
	F	83°55.240’	24°47.555’
	G	83°48.405’	24°57.065’
	H	83°41.841’	24°52.859’
	A	83°38.550’	24°58.300’

Preferred Alternative 4: Add a new area, Pulley Ridge South Portion A, within the Pulley Ridge North HAPC and adjacent to Pulley Ridge South HAPC with separate regulations. Within the Pulley Ridge South A HAPC, the following regulations will apply: fishing with a bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round.[32] Pulley Ridge South Portion A will be bound by the following coordinates, connecting in order:

Site	Point	Longitude (West)	Latitude (North)
Pulley Ridge South Portion A Depth Range: 162-654 ft (27-109 fathoms) Area: 93.6 nm^2	A	83°41.366'	24°40.000'
	B	83°42.648'	24°39.666'
	C	83°55.240'	24°47.555'
	D	83°48.405'	24°57.065'
	E	83°41.841'	24°52.859'
	F	83°47.250'	24°43.917'
	A	83°41.366'	24°40.000'

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

4.1.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Alternative 1 (No Action) would maintain the status quo. The portion of Pulley Ridge that is closed to bottom-tending gear would continue to be closed, and the portion open to bottom-tending gear would continue to be open. **Alternative 1** is the least conservative, and would have the most negative effects on the physical and biological/ecological environment compared to the other alternatives in this action. Any bottom-tending gear fishing effort that occurs on the sites proposed in Action 1 would continue, as would the potential harm to coral habitat and associated fauna inflicted by such fishing gear at these locations. Negative effects from bottom-tending gear include overturning of bottom habitat from trawls, entanglement of vertical structure from bottom longlines and other gear, crushing and displacement of bottom habitat from anchors and traps, among others. Bottom-tending gear scrapes or ploughs the bottom causing sediment to re-suspend and the physical removal of non-target species (Collie et al. 1997). Disturbed areas have lower biomass, lower species richness and diversity, and are dominated by less dimensional organisms (Collie et al. 1997). Cumulative effects of continuous trawling can potentially lead to permanent changes in the benthos. Bycatch of shellfish and crabs is high in traps (Chuenpagdee et al. 2003), and trap movement from severe weather or circulation patterns can damage the benthos. Bycatch of non-target finfish is high in bottom longlines (Chuenpagdee et al. 2003), and bottom longlines can get entangled in structure that rises off the seafloor, thereby strangling stationary organisms, or potentially entangling larger animals (e.g. dolphins, whales, and turtles). After a thorough investigation of gear types and attitudes towards them, dredges and bottom trawls ranked highest in negative impacts to physical and biological habitats, while dredges, pots, and bottom longlines were identified as having negative effects on shellfish, crabs, and finfish via bycatch (Chuenpagdee et al. 2003). Thus, bottom trawls and dredges have more stringent

[32] While not included in this list, it was the intent of the Council to prohibit dredge fishing in this new area through Action 7.

management polices than do pots, traps, and bottom longlines (Chuenpagdee et al. 2003). Mortality associated with bycatch of sharks on bottom longlines is directly linked to depth and soak time (Morgan and Carlson 2010).

Alternative 2 would have the most positive effects on the physical environment because it would prohibit fishing with bottom-tending gear in the largest area, minimizing the effects of bottom-tending gear in the largest area. This alternative would allow areas that have been affected by bottom-tending gear to recover, and would prevent future bottom-tending gear from entering and causing further damage. **Alternative 2** would have the most positive effect on the biological/ecological environment by prohibiting fishing with bottom-tending gear in the largest area. This would prevent potential damage or mortality to sedentary benthic organisms, and reduce the mortality of fish that are targeted or are caught as bycatch in this area. Additionally, reducing or eliminating impacts to the physical and biological environments helps to preserve and protect the ecological environment, maintaining the habitat that other organisms and fish depend on for food, shelter, and reproduction. However, mapping and scientific evidence suggests that much of this area encompassed in **Alternative 2** is likely soft substrate, and may not be home to many of the long-lived organisms and corals that are the objective of the HAPC protection. Indirect effects from **Alternative 2** could be increased fishing effort in areas outside of the Pulley Ridge HAPC encompassed by the coordinates in **Alternative 2**. As **Alternative 2** includes many areas that are subject to intense fishing, it is likely that this alternative could have negative effects on the physical and biological environments of surrounding areas that may not currently be the target of fishing pressure. Thus, **Alternative 2** could shift damage to the physical and biological/ecological environment by increasing use of bottom-tending gear in other areas.

Alternative 3 would have positive effects on the physical and biological/ecological environments by extending protections from bottom-tending gear to an area that has been documented to have coral by recent scientific survey. This alternative would prevent any future damage to the area from bottom-tending fishing gear. **Alternative 3** would have direct positive effects on the physical and biological/ecological environments encompassed by the coordinates outlined, but could have indirect negative effects on other physical and biological/ecological areas if fishing effort shifted and concentrated in an area outside of this proposed alternative. Currently, there is heavy fishing with bottom longlines in the area identified as having corals and within the coordinates of **Alternative 3**. Fishing gear interacting with the corals within this area has also been documented, though many of the damaged corals were caused by traps and not bottom longlines. There have been documented instances of monofilament becoming entangled in corals.

Preferred Alternative 4 would have the least positive direct physical and biological/ecological effects when compared with **Alternative 2** and **Alternative 3**, but may have the least indirect negative physical and biological/ecological effects when compared with those two alternatives as it would only freeze the footprint of existing fishing activity (i.e. it would not potentially displace fishing activity to other areas). **Preferred Alternative 4** would maintain the extent of fishing so that historical fishing with bottom-tending gear activity that has been documented either via vessel monitoring system (VMS), electronic logbook (ELB), or the shark bottom longline observer program would continue to be allowed, but no other bottom-tending gear could be used.

Since there has been no documented ELB activity, minimal fishing activity from shark bottom longline vessels, and the VMS activity that has been documented is from vessels that use bottom longlines, **Preferred Alternative 4** would continue to allow bottom longlining while eliminating potential damage from other types of bottom-tending gear (bottom trawl, buoy gear [but not HMS buoy gear], dredge, pots or traps, or anchors from fishing vessels).

4.1.2 Direct and Indirect Effects on the Economic Environment

This action considers modifying the existing HAPC boundary for regulations in Pulley Ridge. **Alternative 1** (No Action) would not modify the existing Pulley Ridge South HAPC or change the area subject to fishing regulations. **Alternative 2** would expand the fishing regulations for Pulley Ridge South HAPC to the entire Pulley Ridge North HAPC. **Alternative 3** would modify the Pulley Ridge South HAPC to include Pulley Ridge South Portion A and implement the existing regulations from the Pulley Ridge South HAPC throughout the area. **Preferred Alternative 4** would add Pulley Ridge South Portion A within Pulley Ridge North, but with separate regulations from Pulley Ridge South HAPC; the one distinction in regulations between the two areas is that the Pulley Ridge South HAPC would not allow the use of bottom longline, whereas Pulley Ridge South Portion A would allow the use of that gear.

Alternatives 2, **3**, and **Preferred Alternative 4** would be expected to result in negative direct economic impacts due to the expansion of fishing regulations. **Alternative 2** would be expected to result in the greatest negative direct economic impacts, followed by **Alternative 3** and then **Preferred Alternative 4**, due primarily to the area of expansion. **Preferred Alternative 4**, while having the same area of expansion as **Alternative 3**, would still allow bottom longline gear, thereby having less of an impact on fishermen. However, preserving the habitat and ecosystem on which the fisheries depend may have positive long-term indirect economic benefits.

The alternatives can also be analyzed in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels (which includes vessels dually permitted for commercial shark fishing). The existing Pulley Ridge South HAPC (**Alternative 1**) had no ELB data points or vessels from 2004-2013. There were 1,605 VMS data points and 65 unique vessels from 2007-2015, which corresponds to an annual average of 178.3 VMS data points and 7.2 unique vessels. The entire Pulley Ridge North HAPC (**Alternative 2**) had 59 ELB data points and 8 unique vessels from 2004-2013. There were 70,894 VMS data points and 103 vessels from 2007-2015, which corresponds to an annual average of 7,877.1 VMS data points and 11.4 unique vessels. Pulley Ridge South HAPC and Pulley Ridge South Portion A (**Alternative 3**) had 1 ELB data point and 1 unique vessel from 2004-2013. There were 9,842 VMS data points and 77 unique vessels from 2007-2015, which correspond to an annual average of 1,093.6 VMS data points and 8.6 unique vessels. Pulley Ridge South HAPC and Pulley Ridge South Portion A, with separate regulations for the two areas, (**Preferred Alternative 4**) had one ELB data point and one unique vessel from 2004-2013. There were 4,092 VMS data points from 2007-2015, which correspond to an annual average of 454.7 VMS data points. From 2008-2016 shark bottom longline observer program data, – there were two fishing sets within the area, and those are included in the VMS data.

While recognizing that the presented VMS data includes both fishing and non-fishing points and, therefore, serves as an upper bound for potential impacts on fishing effort, **Alternative 2** had the most VMS data points and unique vessels, followed by **Alternative 3**, **Preferred Alternative 4**, and **Alternative 1**. Out of 135,926 observed bottom longline shark sets from 2008-2016, only 5 unique vessels made sets within the proposed areas, with two sets within the area of **Preferred Alternative 4**; since these vessel were dually permitted for commercial reef fish, these are included in the VMS data   An extremely low number of vessels participating in other HMS activity may be negatively impacted by the proposed HAPCs. In terms of ELB data, which is more likely to only include fishing activity but only represents about 1/3 of federally permitted shrimp vessels, **Alternative 2** had the most ELB data points and unique vessels, followed by **Alternative 3** and **Preferred Alternative 4** tied with 1 ELB data point and 1 unique vessel and then **Alternative 1** with no ELB data points and no unique vessels.

The negative direct economic impacts expected to result from **Alternatives 2**, **3**, and **Preferred Alternative 4** would be due to areas closed for certain gear types, which would affect both commercial and recreational fishing. Some of these losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they would have to avoid the new HAPC areas for continuous fishing. While there are currently a total of 18 active shark vessels in the Gulf of Mexico (Gulf) that could potentially be affected by this amendment (Section 1.1), given the very low level of fishing activity within the proposed areas, it is expected that there would be minimal negative economic impact on the bottom longline shark fishery within any of the alternatives in Action 1 and the remaining proposed areas in this amendment. It is unknown how many commercial or recreational HMS permit holders fish this area with bottom tending gear, and may be affected by this action. Some positive indirect economic impacts may result from **Alternatives 2**, **3**, and **Preferred Alternative 4** by providing protection not just to the coral and habitat on which many fishery species depend, but also to the fish themselves that are targeted commercially or recreationally, if those areas act as a source for new recruits.

4.1.3 Direct and Indirect Effects on the Social Environment

Additional effects would not be expected from retaining **Alternative 1**, as the existing regulations prohibiting gear that interacts with the bottom would continue to be prohibited within Pulley Ridge South, only. Some negative effects would be expected from expanding the area with associated fishing and gear prohibitions. The scope of these effects would relate to the spatial extent of areas that would be covered with new prohibitions, and the types of fishing or bottom gear that would be prohibited in the respective area expansions.

The greatest negative effects would be expected under **Alternative 2**, which would expand the prohibition on all bottom-tending gear to the largest area, totaling 2,302.4 nm^2. The intent of this action is to protect significant coral communities, which have not been documented in much of this area. On the other hand, this area is used substantially by fishermen employing bottom longlines and bottom trawling. Thus, negative social impacts from this alternative may not be offset as any coral protection may be minimal. All bottom-tending gear, including anchoring, would be prohibited under **Alternative 2** resulting in direct negative effects on fishermen.

Alternative 3 would extend the regulations in place under **Alternative 1** to an area nearly twice the size of the existing Pulley Ridge South totaling 194.2 nm^2. This expansion area was found to contain high densities of red grouper pits. Negative effects would be expected for those fishermen who currently use the area, especially for bottom longline fishermen who target red grouper. This area is beyond the 35-fathom contour within which bottom longlining is prohibited from June through August each year, and bottom longline fishermen report the area contains important fishing grounds during the months of the 35-fathom contour longline closure.

Preferred Alternative 4 is similar to **Alternative 3**, except there would not be a prohibition on bottom longlining in the expansion area. This would allow bottom longlining for red grouper to continue in the expansion area, where the hard bottom contains plate coral that is not susceptible to breakage as are branching corals. **Preferred Alternative 4** would allow HMS commercial and recreational bottom longlining for shark to continue. The prohibition on anchoring within the existing boundaries of Pulley Ridge South would continue, along with the prohibition on all other bottom-tending gear. Thus, **Preferred Alternative 4** would be expected to result in the fewest direct negative effects among **Alternatives 2-4**.

4.1.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no effect on the administrative environment because nothing further would be required. **Alternative 2** and **Alternative 3** would have analogous effects on the administrative environment because they would both require that the National Oceanic and Atmospheric Administration (NOAA) Office of Coast Survey update navigational charts. **Preferred Alternative 4** would require that an additional set of regulations be proposed and implemented for the extended area outside of Pulley Ridge that are different from the regulations of the existing HAPC. **Preferred Alternative 4** would be more of administrative burden than either **Alternative 2** or **Alternative 3** because it would be more difficult to enforce differing regulations in adjacent areas; however, consultations with the Law Enforcement Technical Committee have indicated that with clearly defined boundaries, it is possible. **Alternative 2**, **Alternative 3**, and **Preferred Alternative 4** would all require more extensive consultations by the National Marine Fisheries Service (NMFS) should any other action (non-fishing activities) be proposed in the area identified. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other federal laws and policies. The implementation of a number of federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs for the fish species managed by the Gulf of Mexico Fishery Management Council (Council) and NMFS. The designation of EFH requires other federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.2 Action 2 – New Areas for HAPC Status in the Southeastern Gulf

Alternative 1: No Action. Do not establish any HAPCs in the Southeastern Gulf.

Alternative 2: Establish a new HAPC named Long Mound bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Long Mound	A	84°47.955'	26°28.835'
Depth Range:	B	84°45.051'	26°28.790'
984-2298 ft	C	84°45.153'	26°23.562'
(164-383 fathoms)	D	84°48.055'	26°23.607'
Area: 13.6 nm^2	A	84°47.955'	26°28.835'

Option a. Do not establish fishing regulations in the Long Mound HAPC
Option b. Prohibit fishing with bottom-tending gear in the Long Mound HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Alternative 3: Establish a new HAPC named Many Mounds bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Many Mounds	A	84°45.246'	26°13.000'
Depth Range:	B	84°39.559'	26°13.015'
654-2298 ft	C	84°39.611'	26°10.401'
(109-383 fathoms)	D	84°45.435'	26°10.565'
Area: 13.0 nm^2	A	84°45.246'	26°13.000'

Option a. Do not establish fishing regulations in the Many Mounds HAPC
Option b. Prohibit fishing with bottom-tending gear in the Many Mounds HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Alternative 4: Establish a new HAPC named North Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
North Reed	A	84°48.104'	26°20.993'
Depth Range:	B	84°42.302'	26°20.902'
984-2952 ft	C	84°42.354'	26°18.289'
(164-492 fathoms)	D	84°48.154'	26°18.380'
Area: 13.6 nm^2	A	84°48.104'	26°20.993'

Option a. Do not establish fishing regulations in the North Reed HAPC
Option b. Prohibit fishing with bottom-tending gear in the North Reed HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Alternative 5</u>: Establish a new HAPC named West Florida Wall bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
West Florida Wall Depth Range: 1308-1974 ft (218-329 fathoms) Area: 36.3 nm^2	A	84°47.955’	26°28.835’
	B	84°46.754’	26°28.816’
	C	84°42.076’	26°10.471’
	D	84°44.577’	26°10.528’
	E	84°47.986’	26°25.028’
	F	84°47.980’	26°25.100’
	A	84°47.955’	26°28.835’

Option a. Do not establish fishing regulations in the West Florida Wall HAPC
<u>Preferred Option b.</u> Prohibit fishing with bottom-tending gear in the West Florida Wall HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

4.2.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

This action proposes to establish new HAPCs in the Southeastern Gulf. **Alternative 1** (No Action) would maintain the status quo. None of the areas proposed in this action would be considered HAPCs. **Alternative 1** is the least conservative, and would have the most negative effects on the physical and biological/ecological environment compared to the other alternatives in this action. Any bottom-tending gear fishing effort that occurs on the sites proposed in Action 2 would continue, as would the potential harm to coral habitat and associated fauna inflicted by such fishing gear at these locations; specific effects of bottom-tending gear are noted in Section 4.1.1. However, it would have no effects when compared to the current management scheme, as there are no regulations on the areas in this action at this time.

Alternatives 2, **3**, and **4**, **Option a** would not be different for the biological or physical environments than **Alternative 1** as the establishment of an HAPC with no regulations does not have any effect on the area. The areas proposed for protection in **Alternatives 2**, **3**, and **4** are already considered coral EFH, and any federal action that may adversely affect this habitat would require consultation with NMFS. **Alternatives 2**, **3**, and **4**, **Option b** would implement bottom-tending gear regulations to protect benthic corals from potential damage from bottom-tending gear in the areas; it would also protect fish and other organisms (listed in section 2.2) from fishing with bottom-tending gear. **Alternatives 2**, **3**, and **4**, **Option b** would have positive physical effects by extending protections from bottom-tending gear to an area that has been documented to have coral by recent scientific survey. This option would prevent any future damage to the area from bottom-tending gear. **Alternatives 2**, **3**, and **4**, **Option b** would have direct positive physical and biological/ecological effects on the area encompassed by the coordinates outlined, but could have indirect negative effects if fishing effort shifted and concentrated in an area outside of this proposed alternative by adding more fishing mortality stress and bottom habitat contact to other areas. However, a shift in fishing effort is unlikely as heavy fishing activity by vessels with bottom-tending gear has not been documented in the area proposed for protection under **Preferred Alternatives 2**, **3**, and **4**. Thus, information on species targeted in this area cannot be gleaned.

The effects of **Preferred Alternative 5**, **Option a** would not be different than **Alternative 1** as the establishment of an HAPC with no regulations does not have any effect on the area. The area proposed in **Preferred Alternative 5** is already considered coral EFH, thus, any federal action that may adversely affect this habitat would require consultation with NMFS**. Preferred Alternative 5**, **Preferred Option b** would have direct positive physical and biological/ecological effects on the area encompassed by the West Florida Wall coordinates outlined, but could have indirect negative effects if fishing effort shifted and concentrated in an area outside of this proposed alternative by adding more fishing mortality stress and bottom habitat contact to other areas. However, a shift in fishing effort is unlikely as the West Florida Wall is not an area that has been identified as having bottom-tending gear used to target species. The West Florida Wall encompasses a steep wall feature that extends along the west Florida shelf in the 1312-1969 ft (218-328 fathom) depth range. This feature extends through Long Mound, Many Mounds, and the North Reed Site (**Alternatives 2-4**), but would focus the HAPC status on the wall feature and not surrounding areas that do not have the same vertical relief, but could include smaller mound-like features. Lastly while the feature extends through Long Mound, Many Mounds and North Reed Site (**Alternatives 2-4**), the areal extent of the West Florida Wall Boundary is slightly smaller at 36.3 nm^2, whereas the combined area of Long Mound, Many Mounds, and North Reed Site is 40.2 nm^2. Thus selecting **Preferred Alternative 5** as the preferred alternative would convey protections to a continuous feature, but to less overall area.

4.2.2 Direct and Indirect Effects on the Economic Environment

Alternative 1 would not be expected to result in any direct or indirect economic impacts. **Alternatives 2**, **3**, or **4**, or **Preferred Alternative 5** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects, as well as an increase in the intrinsic value the public places on these coral communities.

Alternatives 2, **3**, **4**, and **Preferred Alternative 5** with **Preferred Option b** would each create a new HAPC with a prohibition on bottom-tending gear. The alternatives were analyzed in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels. None of the proposed HAPCs in **Alternatives 2-4** or in **Preferred Alternative 5** had any ELB data points or vessels from 2004-2013. VMS data points and unique vessels for **Alternatives 2-4** and **Preferred Alternative 5** cover the years 2007-2015. The Long Mound HAPC (**Alternative 2**) had 6 VMS data points and 4 unique vessels. The Many Mounds HAPC (**Alternative 3**) had 16 VMS data points and 9 unique vessels. The North Reed HAPC (**Alternative 4**) had 4 VMS data points and 4 unique vessels. The West Florida Wall HAPC (**Preferred Alternative 5**) had 15 VMS points and 6 unique vessels. While recognizing that the presented VMS data includes both fishing and non-fishing points and therefore serves as an upper bound for potential impacts on fishing effort, **Alternative 3** had the most VMS data points and unique vessels, followed by **Preferred Alternative 5** and then **Alternatives 2** and **4**. **Alternatives 2** and **4** each had the same number of unique vessels, with two additional VMS data points contained within **Alternative 2**.

Minor negative direct economic effects would be expected to result, as shark bottom longline observer data, VMS, and shrimp ELB data do not indicate significant fishing effort in the area. An extremely low number of vessels participating in other HMS activity may be negatively impacted by the proposed HAPCs. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits.

4.2.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established on the west Florida shelf. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Alternatives 2**, **3**, and **4** would each create a new HAPC on the west Florida shelf, which do not include prohibitions on bottom-tending gear (**Option a**) or do include prohibitions on all bottom-tending gear (**Option b**), including anchoring by fishing vessels. **Preferred Alternative 5** would establish an HAPC that overlaps areas proposed under **Alternatives 2**, **3**, and **4**, and provides the same options on bottom-tending gear. The fewest effects would be expected from **Option a** under each of the alternatives, as an HAPC would be established with no attending restrictions to human activity within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

The potential for negative effects is greater under **Preferred Option b**, as all bottom-tending gear would be prohibited within the boundaries of each new HAPC. However, in contrast with the potential expansion of the Pulley Ridge HAPC (Action 1), the proposed west Florida shelf HAPCs are deeper and farther from shore and each covers a smaller area of roughly 13 nm^2 (except **Preferred Alternative 5** which overlaps the HAPCs proposed under **Alternatives 2**, **3**, and **4** and would cover an area of approximately 36 nm^2). Further, there is little evidence of human activity that would be affected by the fishing and gear restrictions under **Preferred Option b**. From March 2007 until July 2015, there is no evidence of shrimping or use of bottom-tending gear by shark or reef fish fishermen within the proposed Long Mound HAPC (**Alternative 2**; Figure 2.2.1), or the proposed North Reed Site HAPC (**Alternative 4**), suggesting there would be no additional effects in establishing either of these HAPCs compared to **Alternative 1**. Over the same time period, there is no evidence of shrimping within the proposed Many Mounds HAPC (**Alternative 3**) and only a very small number of VMS pings (less than 15) from bottom longline vessels over the same 8-year time period. Nevertheless, this suggests the potential for negative effects would likely be greatest from establishing the Many Mounds HAPC (**Alternative 3**), but these effects would be minimal to negligible. Ultimately, the recorded activity over 8 years suggests that any effects of establishing these HAPCs would be minimal. It is possible that some fishing effort could shift, although any effects from such effort shifting remain unknown.

The proposed HAPCs under **Alternatives 2**, **3**, and **4** are discrete in area; thus, all three may be selected as new HAPCs. **Preferred Alternative 5** overlaps parts of each of the proposed HAPCs under **Alternatives 2**, **3**, and **4**. **Preferred Alternative 5** would encompass an area slightly smaller than the total area covered by the three proposed HAPCs under **Alternatives 2**, **3**, and **4** (Table 2.2.1), but would occupy a continuous area that parallels the 1,312-1,969 ft (218-328 fathoms) depth range. The amount of current fishing activity in the proposed HAPC under **Preferred Alternative 5** is minimal and similar to that within the proposed HAPCs under **Alternatives 2**, **3**, and **4**. Thus, any effects from **Preferred Alternative 5** would be minimal and similar to the cumulative effects of adopting the three proposed HAPCs under **Alternatives 2**, **3**, and **4**.

4.2.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no effect on the administrative environment because nothing further would be required. **Option a** for **Alternatives 2**, **3**, **4,** and **Preferred Alternative 5** would have analogous effects on the administrative environment because these areas already require EFH consultations, but would not require any associated fishing regulations. As HAPCs are a subset of EFH, and these areas are already considered coral EFH, it is unlikely that there would be additional administrative burden. **Preferred Option b** for **Alternatives 2**, **3**, **4,** and **Preferred Alternative 5** would require an additional administrative burden of implementing regulations for prohibiting bottom-tending gear. The NOAA Office of Coast Survey would need to update nautical charts to reflect the newly established areas. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other Federal laws and policies. The implementation of a number of Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other Federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.3 Action 3 – New Areas for HAPC Status in the Northeastern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northeastern Region

Preferred Alternative 2: Establish a new HAPC named Alabama Alps Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Alabama Alps Reef Depth Range: 162-654 ft (27-109 fathoms) Area: 2.7 nm^2	A	88°20.525'	29°16.160'
	B	88°18.990'	29°15.427'
	C	88°19.051'	29°13.380'
	D	88°20.533'	29°14.140'
	A	88°20.525'	29°16.160'

Option a. Do not establish fishing regulations in the Alabama Alps Reef HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the Alabama Alps Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit fishing with the following bottom-tending gear in the Alabama Alps HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

Preferred Alternative 3: Establish a new HAPC named L&W Pinnacles and Scamp Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
L&W Pinnacles and Scamp Reef Depth Range: 330-984 ft (55-164 fathoms) Area: 14.3 nm^2	A	87°48.757'	29°18.595'
	B	87°50.688'	29°18.484'
	C	87°52.484'	29°19.754'
	D	87°51.449'	29°20.401'
	E	87°50.933'	29°20.095'
	F	87°46.631'	29°20.832'
	G	87°46.326'	29°21.473'
	H	87°45.535'	29°21.314'
	I	87°43.465'	29°22.518'
	J	87°42.632'	29°21.144'
	K	87°45.525'	29°19.269'
	A	87°48.757'	29°18.595'

Option a. Do not establish fishing regulations in the L&W Pinnacles and Scamp Reef HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the L&W Pinnacles and Scamp Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit fishing with the following bottom-tending gear in the L&W Pinnacles and Scamp Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

<u>Preferred Alternative 4</u>: Establish a new HAPC named Mississippi Canyon 118 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 118 Depth Range: 2622-4920 ft (437-820 fathoms) Area: 11.0 nm^2	A	88°30.789’	28°53.183’
	B	88°27.819’	28°53.216’
	C	88°27.782’	28°50.602’
	D	88°27.759’	28°48.944’
	E	88°30.727’	28°48.962’
	A	88°30.789’	28°53.183’

Option a. Do not establish fishing regulations in the Mississippi Canyon 118 HAPC.
<u>Preferred Option b.</u> Prohibit fishing with bottom-tending gear in the Mississippi Canyon 118 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Alternative 5</u>: Establish a new HAPC named Roughtongue Reef bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Roughtongue Reef Depth Range: 162-654 ft (27-109 fathoms) Area: 13.6 nm^2	A	87°37.527’	29°27.596’
	B	87°31.552’	29°27.621’
	C	87°31.539’	29°25.007’
	D	87°37.510’	29°24.981’
	A	87°37.527’	29°27.596’

Option a. Do not establish fishing regulations in the Roughtongue Reef HAPC.
<u>Preferred Option b</u>. Prohibit fishing with bottom-tending gear in the Roughtongue Reef HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Option c. Prohibit fishing with the following bottom-tending gear in the Roughtongue Reef HAPC: bottom longline, bottom trawl, buoy gear*, dredge, and pots or traps.

<u>Preferred Alternative 6</u>: Establish a new HAPC named Viosca Knoll 826 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 826 Depth Range: 1638-2952 ft (273-492 fathoms) Area: 10.3 nm^2	A	88°03.509’	29°10.920’
	B	87°59.460’	29°10.877’
	C	87°59.448’	29°07.974’
	D	88°03.532’	29°08.017’
	A	88°03.509’	29°10.920’

Option a. Do not establish fishing regulations in the Viosca Knoll 826 HAPC.
<u>Preferred Option b.</u> Prohibit fishing with bottom-tending gear in the Viosca Knoll 826 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 7: Establish a new HAPC named Viosca Knoll 862/906 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Viosca Knoll 862/906 Depth Range: 984-2298 ft (164-383 fathoms) Area: 18.8 nm^2	A	88°23.608’	29°07.640’
	B	88°20.590’	29°07.603’
	C	88°20.554’	29°03.749’
	D	88°22.016’	29°03.734’
	E	88°21.998’	29°02.367’
	F	88°24.972’	29°02.281’
	G	88°25.044’	29°07.568’
	H	88°25.044’	29°07.592’
	I	88°25.045’	29°07.676’
	A	88°23.608’	29°07.640’

Option a. Do not establish fishing regulations in the Viosca Knoll 862/906 HAPC.
Option b. Prohibit fishing with bottom-tending gear in the Viosca Knoll 862/906 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.
Preferred Option c. Prohibit fishing with bottom-tending gear in the Viosca Knoll 862/906 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels. Provide an exemption to the prohibition on fishing with bottom-tending gear for fishermen that possess a royal red shrimp endorsement and are fishing with royal red shrimp fishing gear.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

4.3.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Alternative 1 (No Action) would maintain the status quo and would not propose new HAPCs. This alternative is the least conservative, and would have the most negative effects on the physical and biological/ecological environment compared to the other alternatives in this action. Any bottom-tending gear fishing effort that occurs on the sites proposed in Action 3 would continue, as would the potential harm to coral habitat and associated fauna inflicted by such fishing gear at these locations (see Section 4.1.1. for effects of bottom-tending gear). However, it would have no physical or biological/ecological effects when compared to the current management scheme, as there are no regulations on the areas in this action at this time.

Preferred Alternatives 2-7, **Option a** would not be different from **Alternative 1** with regard to the biological/ecological and physical effects because it will not include any prohibitions on the use of bottom-tending gear and would have negative effects on the physical, biological and ecological environment (see Section 4.1.1. for effects of bottom-tending gear) when compared to **Preferred Alternatives 2-7**, **Preferred Options b** and **c** which would prohibit all or some bottom-tending gear. **Preferred Alternatives 2-6**, **Preferred Option b** and **Preferred Alternative 7**, **Option b** would have the most positive direct physical and biological/ecological effects as they would prohibit all bottom fishing from the proposed HAPCs. However, there could be indirect physical and biological/ecological effects if fishing effort were to concentrate in other areas because it has been displaced from this area and shifts effects of fishing to other areas. **Preferred Alternative 2**, **3**, **5**, and **7**, **Option c** would freeze the footprint of fishing so that fishing documented either via VMS or ELB may continue, but prevent other bottom-tending gear from entering the area. The VMS activity that has been documented is from vessels that use bandit rigs, **Preferred Alternatives 2**, **3**, and **5**, **Option c** would continue to allow anchoring by fishing vessels while eliminating potential damage from other types of bottom-tending gear, but likely not change the biological/ecological effects on target species (reef fish) as it would allow the fishing that has been occurring (via bandit rigs) to continue; there has been no documented ELB activity in the areas identified for **Preferred Alternatives 2**, **3**, and **5**.

There are likely negative indirect effects of **Preferred Alternative 7, Option b** because it would shift effort from a common royal red shrimp ground to other areas to fish for royal red shrimp. This could lead to prosecuting deep royal red shrimping in new areas which could harm other sensitive areas that were previously unfished. It could also increase distances that fishermen have to travel as there have been two identified areas for royal red shrimp fishing in the Gulf, and the second area is south of Pulley Ridge. Currently, the area trawled for royal red shrimp is very narrow, and the royal red shrimp fishermen are well acquainted with the corals in the area and avoid them. Closing this area to royal red shrimping would force those shrimp fishermen to either stop operating or to find new royal red shrimp grounds, which would be expected to have negative effects on the physical and biological environments of those new areas. **Preferred Alternative 7**, **Preferred Option c** would allow existing royal red shrimp vessels using the area to continue to fish, and thus would have direct positive effects on both the physical and biological/ecological environment because it would be preventing future use of the area by other bottom-tending gear. **Preferred Alternative 7**, **Preferred Option c** would have more negative effects than **Option b** because it would continue to allow bottom trawling by shrimp fishermen. There are no anticipated indirect effects to the physical or biological environment as **Preferred Option c** would freeze the footprint of fishing, but not cause effort to shift to other areas as a result of this action.

Alternative 1 would have the least effects on the fishing community as it would be maintaining the status quo, and not expand the regulated area. However, **Alternative 1** would also not protect the identified coral communities from any future fishing effects and would be the least beneficial to the biological community. **Alternatives 2-7, Option a** would not be significantly different from **Alternative 1** for the physical or biological/ecological environment because it would not have any prohibitions on bottom-tending gear in these areas. **Preferred Alternatives 2-6**, **Preferred Option b** and **Preferred Alternative 7**, **Option b** would be the most beneficial to the biological community, but the least beneficial to the fishing community because it would prohibit fishing with bottom-tending gear from areas that are currently fished. **Preferred Alternatives 2**, **3**, **5**, **Option c** and **Preferred Alternative 7**, **Preferred Option c** could be considered a compromise in that it allows fishing that has been present to continue, but prevents future effects on the biological community from other types of bottom-tending gear. Based on VMS and HMS information, it is unlikely that HMS permit holders will be affected by this action as all active HMS vessels in the Gulf also have VMS and are incorporated in the discussion of effects on vessels with VMS.

4.3.2 Direct and Indirect Effects on the Economic Environment

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2-7** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

The alternatives can be analyzed in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels (which includes commercial shark fishermen dually permitted with a commercial reef fish permit). From 2008 – 2016, shark bottom longline observer data recorded two sets by two vessels in the area of L & W Pinnacles and Scamp Reef, both of which were dually permitted. An extremely low number of vessels participating in other HMS activity may be negatively impacted by the proposed HAPCs. ELB data points and unique vessels are for the years 2004-2013, while VMS data points and unique vessels are for the years 2007-2015. These data points and unique vessels affected by **Preferred Alternatives 2-7** are displayed in Table 4.3.2.1 and do not pertain to **Option a** under any of the alternatives, as that option would not establish fishing regulations.

Preferred Alternative 2 with either **Preferred Option b** or **Option c** would create the new HAPC named Alabama Alps Reef. VMS data indicate that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would only be affected by the **Preferred Option b** prohibition on bottom-tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from selection of either **Preferred Option b** or **Option c**. The negative effect would be greater with **Preferred Option b**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits.

Preferred Alternative 3 with either **Preferred Option b** or **Option c** would create the new HAPC named L&W Pinnacles and Scamp Reef. VMS data indicate that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would thereby only be affected by the **Preferred Option b** prohibition on bottom-tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from selection of either **Preferred Option b** or **Option c**. The negative effect would be greater with **Preferred Option b**.

Preferred Alternative 4 with **Preferred Option b** would create the new HAPC named Mississippi Canyon 118 and prohibit the use of bottom-tending gear. Minimal negative direct economic effects would be expected to result, as VMS and Shrimp ELB data indicate that this is not a heavily fished area.

Preferred Alternative 5 with either **Preferred Option b** or **Option c** would create the new HAPC named Roughtongue Reef. VMS data indicate that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would thereby only be affected by the **Preferred Option b** prohibition on bottom-tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from selection of either **Preferred Option b** or **Option c**. The negative effect would be greater with **Preferred Option b**.

Preferred Alternative 6 with **Preferred Option b** would create the new HAPC named Viosca Knoll 826 and prohibit the use of bottom-tending gear. VMS data indicate that this area is minimally fished, and further analysis of the data indicates that most of the fishing occurs with bandit gear. As a result, while not quantifiable, minimal negative direct economic effects would be expected to result from selection of **Preferred Option b**.

Preferred Alternative 7 with either **Option b** or **Preferred Option c** would create the new HAPC named Viosca Knoll 862/906. Selection of **Option b** would implement a prohibition on bottom-tending gear; selection of **Preferred Option c** would also prohibit fishing with bottom-tending gear while providing an exemption for fishermen with a royal red shrimp endorsement and utilizing royal red shrimp gear. The exemption provided for in **Preferred Option c** is due to royal red shrimp nets commonly being retrieved and reset in this area, and contact with the coral itself does not generally occur here. While not quantifiable, negative direct economic effects would be expected to result from selection of either **Option b** or **Preferred Option c**. The negative effect would be greater with **Option b**, as vessels would need to begin net retrieval farther from the new HAPC area than currently occurring. As a result, additional prime shrimping grounds would be fished far less frequently. **Preferred Option c** would lessen these negative effects by allowing a segment of the fishery that has historically used the area to continue to do so. The potential remains that expansion of federal shrimp permit holders into royal red shrimp fishering could occur, which could negatively impact the biological environment in the new HAPC.

For all alternatives, recreational fishing could also be impacted by the gear restriction. Some of the commercial and recreational impacts under **Option b** or **Option c** would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by protecting coral and also fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity.

While recognizing that the presented VMS data includes both fishing and non-fishing points and therefore serves as an upper bound for potential impacts on fishing effort, the alternatives are ranked from least to most vessels as follows: **Preferred Alternative 2**, **Option c**; **Preferred Alternative 4**, **Preferred Option b**; **Preferred Alternative 6**, **Preferred Option b**; **Preferred Alternative 3**, **Option c**; **Preferred Alternative 5**, **Option c**; **Preferred Alternative 7**, **Option b** tied **Preferred Alternative 7**, **Preferred Option c**; **Preferred Alternative 2**, **Preferred Option b**; **Preferred Alternative 5**, **Preferred Option b**; **Preferred Alternative 3**, **Preferred Option b**. In terms of ELB data, which is more likely to determine fishing activity from non-fishing activity but only represents about 1/3 of federally permitted shrimp vessels, the alternatives are ranked from least to most number of unique vessels as follows: **Preferred Alternative 7**, **Preferred Option c**; **Preferred Alternative 3**, **Preferred Option b** tied with **Preferred Alternative 3**, **Option c**; **Preferred Alternative 5**, **Preferred Option b** tied with **Preferred Alternative 5**, **Option c**; **Preferred Alternative 6**, **Preferred Option b**; **Preferred Alternative 2**, **Preferred Option b** tied with **Preferred Alternative 2**, **Option c** and tied with **Preferred Alternative 4**, **Preferred Option b**; and **Preferred Alternative 7**, **Option b.**

Table 4.3.2.1. Number of VMS and ELB data points and unique vessels affected by **Preferred Alternatives 2-7**.

Alternatives	Options	VMS		ELB	
		Data Points	Unique Vessels	Data Points	Unique Vessels
Alternative 2	**Preferred Option b**	2,201	43	11	6
	Option c	215	6	11	6
Alternative 3	**Preferred Option b**	11,320	82	2	1
	Option c	443	10	2	1
Alternative 4	**Preferred Option b**	46	8	36	6
Alternative 5	**Preferred Option b**	11,420	79	5	2
	Preferred Option c	544	11	5	2
Alternative 6	**Preferred Option b**	41	9	12	3
Alternative 7	**Option b**	182	23	1,681	13
	Preferred Option c	182	23	0	0

Source: NOAA Office of Law Enforcement, 2015 – VMS. Southeast Fisheries Science Center- 2014- ELB

4.3.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the northeastern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2-7** would each create new HAPCs in the northeastern region. The fewest effects would be expected from **Option a** under each of the alternatives, as an HAPC would be established with no attending restrictions on fishing or gear within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

Prohibiting all bottom-tending gear, including anchoring (**Preferred Options b,** except **Preferred Alternative 7** has **Preferred Option c**), would be expected to result in negative effects. The effects would be greater for those proposed HAPCs in which there is substantial human activity, and effects would be less for those proposed HAPCs in which there is less human activity. There is substantial fishing activity with bottom-tending gear, including bottom longlines and anchoring by both commercial and recreational vertical line fishermen within the proposed sites of Roughtongue Reef (**Preferred Alternative 5**) and L&W Pinnacles and Scamp Reef (**Preferred Alternative 3**), followed by Alabama Alps Reef (**Preferred Alternative 2**), which is smaller and has evidence of less fishing activity. Thus, establishing these HAPCs with a prohibition on all bottom-tending gear, including anchoring (**Preferred Options b**), would be expected to result in the greatest negative effects among the alternatives. There is no evidence of shrimp activity within these three proposed HAPCs, so effects are not expected for fishermen engaged in shrimping. In contrast to **Preferred Alternatives 2**, **3**, and **5**, very little bottom-tending gear is used in the proposed HAPCs of Mississippi Canyon 118 (**Preferred Alternative 4**), Viosca Knoll 826 (**Preferred Alternative 6**), and Viosca Knoll 862/906 (**Preferred Alternative 7**). Thus, negative effects are not expected for those shrimping or fishing with bottom-tending gear in these areas. An exception is royal red shrimpers, who retrieve their nets in the waters above the reef but within the proposed boundaries of Viosca Knoll 862/906 and would be negatively affected by **Option b**.

An exception to the prohibition on all bottom-tending gear is provided for anchoring (**Options 2c**, **3c**, and **5c**) within three proposed HAPCs: Alabama Alps Reef (**Preferred Alternative 2**), L&W Pinnacles and Scamp Reef (**Preferred Alternative 3**), and Roughtongue Reef (**Preferred Alternative 5**). Given the substantial fishing activity with vertical line gear in these areas, allowing anchoring would allow this fishing activity to continue. Thus, negative effects would not be expected from **Options c** for **Alternatives 2**, **3**, and **5** compared to the greatest effects expected under **Preferred Options b** for those using vertical line fishing gear. Although there is not a substantial amount of bottom longlining within these proposed HAPCs, for bottom longliners, the effects would be the same between **Preferred Option b** and **Option c**, as bottom longline gear is prohibited under both options.

An exception is also proposed for royal red shrimpers to finish retrieving their nets over the reef area in the proposed Viosca Knoll 862/906 HAPC (**Preferred Alternative 7**, **Preferred Option c**). All other bottom-tending gear would be prohibited, resulting in the same effects for all other fishermen as under **Option b**. Using nets in very deep-water, royal red shrimpers begin pulling their nets up well outside the boundaries of the proposed Viosca Knoll 862/906 HAPC, but the nets have not reached the surface and would still be in the water within the HAPC, if established. Because these shrimpers do not catch royal red shrimp within the coral area of the proposed HAPC, exempting their nets from the prohibition on bottom-tending gear (**Preferred Option c**) would alleviate the potential negative effects on royal red shrimpers while retaining the protections for the coral.

4.3.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no effect on the administrative environment because nothing further would be required. **Option a** for **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would have analogous effects on the administrative environment these areas already require EFH consultations, but would not require any associated fishing regulations. As HAPCs are a subset of EFH, and these areas are already considered coral EFH, it is unlikely that there would be much additional administrative burden. **Preferred Options b** and **c** for **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would require an additional administrative burden of developing and implementing regulations for prohibiting fishing with bottom-tending gear. The only difference between **Preferred Options b** and **c** for **Preferred Alternatives 2**, **3**, **4**, **5**, **6**, and **7** would be the regulations that are proposed and implemented. Identification of EFH, HAPCs, or potential restrictions on fishing activities may have some impact on other federal laws and policies. The implementation of a number of federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.4 Action 4 – New Areas for HAPC Status in the Northwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Northwestern Gulf.

<u>Preferred Alternative 2:</u> Establish a new HAPC named AT 047 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 047 Depth Range: 2622-4920 ft (437-820 fathoms) Area: 6.8 nm^2	A	89°49.404'	27°54.426'
	B	89°46.464'	27°54.486'
	C	89°46.397'	27°51.874'
	D	89°49.336'	27°51.814'
	A	89°49.404'	27°54.426'

Option a. Do not establish regulations in the AT 047 HAPC.

<u>Preferred Option b</u>. Prohibit fishing with bottom-tending gear in the AT 047 Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Alternative 3</u>: Establish a new HAPC named AT 357 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
AT 357 Depth Range: 3282-4920 ft (547-820 fathoms) Area: 6.8 nm^2	A	89°43.068'	27°36.259'
	B	89°40.136'	27°36.315'
	C	89°40.073'	27°33.703'
	D	89°43.004'	27°33.646'
	A	89°43.068'	27°36.259'

Option a. Do not establish regulations in the AT 357 HAPC.

<u>Preferred Option b</u>. Prohibit fishing with bottom-tending gear in the AT 357 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

<u>Preferred Alternative 4</u>: Establish a new HAPC named Green Canyon 852 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 852 Depth Range: 4920-6564 ft (820-1094 fathoms) Area: 3.8 nm^2	A	91°08.929'	27°08.354'
	B	91°08.963'	27°05.740'
	C	91°10.610'	27°05.762'
	D	91°10.567'	27°08.376'
	A	91°08.929'	27°08.354'

Option a. Do not establish regulations in the Green Canyon 852 HAPC.

<u>Preferred Option b</u>. Prohibit fishing with bottom-tending gear in the Green Canyon 852 HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear. Shark Bottom Longline observer data do not show any commercial shark fishing taking place within these proposed areas. It is unknown how many other commercial or recreational HMS permit holders fish this area with bottom tending gear and may be affected by this action.

4.4.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Alternative 1 (No Action) would maintain the status quo, no new HAPCs would be established in the northwestern Gulf. This alternative is the least conservative, and would have the most negative effects on the physical and biological/ecological environment compared to the other alternatives in this action. Any bottom-tending gear fishing effort that occurs on the sites proposed in Action 4 would continue, as would the potential harm to coral habitat and associated fauna inflicted by such fishing gear at these locations. However, it would have no effects compared to the current management scheme, as there are no existing regulations for areas in this action at this time.

Preferred Alternatives 2, **3**, and **4**, **Option a** would have the same effects on the physical and biological environment as Alternative 1. While an HAPC would be established at AT 047, AT 357, and Green Canyon 852, there would be no regulations associated with these areas. **Preferred Alternatives 2-4**, **Preferred Option b** would prohibit fishing with bottom-tending gear, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive physical and biological effects on the coral species identified on the area encompassed by the coordinates outlined. **Preferred Alternatives 2-4**, **Preferred Option b** would also have indirect positive effects on the fish and invertebrate populations located within the sites outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom-tending gear restrictions at AT 047, AT 357, and Green Canyon 852. However, this risk is low as there is minimal bottom-tending gear fishing known to occur in this area, and it is unlikely that fishing occurs in the area. It is unknown how many commercial or recreational HMS permit holders fish this area with bottom tending gear and may be affected by this action. Biological/ecological effects on target species cannot be determined.

For each of the **Preferred Alternatives 2-4**, **Option a** is the least conservative and would have the same negative impacts to the physical and biological environment as **Alternative 1** (continued potential harm to corals due to bottom-tending gear). **Preferred Option b** would provide the most protection to corals in **Preferred Alternatives 2-4,** as **Preferred Option b** restricts bottom-tending gear and would eliminate interactions between this type of gear and any benthic species or habitats found in the sites proposed in Action 6.

4.4.2 Direct and Indirect Effects on the Economic Environment

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2**, **3**, or **4** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternatives 2, **3**, and **4** with **Preferred Option b** would create three new HAPCs with a prohibition on bottom-tending gear. Minor negative direct economic effects would be expected to result, as there is little evidence of bottom-tending gear use in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they would have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by protecting coral and fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity.

The alternatives can also be analyzed in terms of the number of, shark bottom longline observer data, ELB data points and unique vessels, as well as the number of VMS data points and unique vessels. The AT 047 HAPC (**Preferred Alternative 2**) had 3 ELB data points and 2 unique vessels from 2004-2013. There were 2 VMS data points and 2 unique vessels from 2007-2015. The AT 357 HAPC (**Preferred Alternative 3**) had 3 ELB data points and 1 unique vessel from 2004-2013. There were 3 VMS data points and 2 unique vessels from 2007-2015. The Green Canyon 852 HAPC (**Preferred Alternative 4**) had 1 ELB data point and 1 unique vessel from 2004-2013. There were no VMS data points and no unique vessels from 2007-2015. While recognizing that the presented VMS data includes both fishing and non-fishing points and therefore serves as an upper bound for potential impacts on fishing effort through **Preferred Option b** for **Preferred Alternatives 2-4**, **Preferred Alternative 3** had 1 more VMS data point than **Preferred Alternative 2** but an equal number of unique vessels; **Preferred Alternative 4** had no VMS data points and no unique vessels. In terms of ELB data, which is more likely to determine fishing activity from non-fishing activity but only represents about 1/3 of federally permitted shrimp vessels, **Preferred Alternatives 2** and **3** each had 3 ELB data points, with **Preferred Alternative 3** having 1 less unique vessel; **Preferred Alternative 4** had 1 ELB data point, but an equal number of unique vessels as **Preferred Alternative 3**. Shark bottom longline observer data had no observed fishing sets in these areas from 2008 – 2016. An extremely low number of vessels participating in other HMS activity may be negatively impacted by the proposed HAPCs.

4.4.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the northwestern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2-4** would each create a new HAPC in the northwestern region. Minimal to no effects would be expected from **Option a** under each of the alternatives, as an HAPC would be established with no attending restrictions on fishing or gear within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

The potential for negative effects is greater under **Preferred Option b**, as fishing with all bottom-tending gear would be prohibited within the boundaries of each new HAPC. However, the proposed HAPCs are deep (from 2622 to 6564 ft [437 to 1,094 fathoms]), far from shore, and each covers a small area of either 3.8 nm^2 or 6.8 nm^2. Further, there is little evidence of human activity that would be affected by the fishing and gear restrictions under **Preferred Option b**. From March 2007 until July 2015, there are minimal shrimp ELB points recorded, and there is no use of the area by shark or reef fish fishermen within any of the proposed HAPCs (Figure 2.4.1), suggesting there would be minimal to no effects in establishing the AT 047 (**Preferred Alternative 2**), AT 357 (**Preferred Alternative 3**), or Green Canyon 852 (**Preferred Alternative 4**) HAPCs compared to **Alternative 1**.

4.4.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no impact on the administrative environment as it maintains the status quo. The same is true for **Option a** in **Preferred Alternatives 2**, **3**, and **4** as this option for these alternatives attaches an HAPC label to these sites, but would not confer any fishing regulations.

Preferred Option b for **Preferred Alternatives 2**, **3**, and **4** would require an additional administrative burden of developing and implementing regulations prohibiting bottom-tending gear. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other Federal laws and policies. The implementation of a number of Federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.5 Action 5 – New Areas for HAPC Status in the Southwestern Gulf

Alternative 1: No Action. Do not establish any new HAPCs in the Southwestern Gulf.

Preferred Alternative 2: Establish a new HAPC named Harte Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Harte Bank	A	96°36.590’	26°40.826’
Depth Range:	B	96°32.220’	26°40.789’
162-492 ft	C	96°32.308’	26°37.992’
(27-82 fathoms)	D	96°36.636’	26°38.043’
Area: 10.8 nm^2	A	96°36.590’	26°40.826’

Option a. Do not establish fishing regulations in the Harte Bank HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the Harte Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

Preferred Alternative 3: Establish a new HAPC named Southern Bank bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Southern Bank	A	96°31.902’	27°26.923’
Depth Range:	B	96°30.881’	27°26.989’
162-330 ft	C	96°31.134’	27°25.958’
(27-55 fathoms)	D	96°31.892’	27°25.958’
Area: 0.8 nm^2	A	96°31.902’	27°26.923’

Option a. Do not establish fishing regulations in the Southern Bank HAPC.
Preferred Option b. Prohibit fishing with bottom-tending gear in the Southern Bank HAPC. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels.

***Note:** Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.

4.5.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Alternative 1 (No Action) would maintain the status quo, no new HAPCs would be established in the Southwestern Gulf. This alternative is the least conservative, and would have the most negative effects on the physical and biological environment compared to the other alternatives in this action; however, it would have no effects when compared to the current management scheme, as there are no regulations on the area in this action at this time.

Preferred Alternative 2, **Option a** would have the same effects on the physical and biological environment as Alternative 1. An HAPC would be established at Harte Bank with no regulations associated with it. **Preferred Alternative 2**, **Preferred Option b** would prohibit fishing with bottom-tending gear on Harte Bank, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive biological/ecological effects on the coral species identified during scientific survey on the area encompassed by the coordinates outlined. **Preferred Alternative 2**, **Preferred Option b** would also have indirect positive biological/ecological effects on the fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative physical and biological/ecological effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom-tending gear restrictions at Harte Bank. Based on ELB data, closing this area is unlikely to displace shrimp fishing effort as it is minimal within the outlined coordinates. Further inspection of VMS data in the area, results in most points being from vessels that have shrimp permits, not reef fish permits. It has been identified that some vessels with shrimp permits will use bandit-rig gear when not shrimping. Thus, these VMS points may indicate active fishing with bandit-rig gear. When combined with shrimp ELB data, which consists of fishing data points (not fishing and non-fishing activity combined), this area is not an area that is used for shrimp fishing, so these could be transit points. The risk of fishing effort shifting to other areas is low, as there are minimal bottom-tending gear fishing location points occurring in this area, thus it is unlikely that fishing is occurring in the area and biological/ecological effects on target species cannot be determined. It is unknown how many commercial or recreational HMS permit holders fish this area with bottom tending gear and may be affected by this action.

Preferred Alternative 3, **Option a** would have the same effects on the physical and biological/ecological environment as **Alternative 1**. While an HAPC would be established at Southern Bank, there would be no regulations associated with it. **Preferred Alternative 3**, **Preferred Option b** would prohibit fishing with bottom-tending gear on Southern Bank, which would protect benthic corals at this site from fishing gear interactions. There would be direct positive physical and biological/ecological effects on the coral species identified during scientific survey on the area encompassed by the coordinates outlined. **Preferred Alternative 3**, **Preferred Option b** would also have indirect positive biological/ecological effects on the fish and invertebrate populations located within the coordinates outlined, as the protection to corals inherently protects the habitat used by some of these species. There is a risk of indirect negative effects on areas outside of this proposed alternative if fishing effort shifts in response to the bottom-tending gear restrictions at Southern Bank. This risk is unlikely as there is minimal bottom-tending gear fishing effort in within the coordinates outlined in **Preferred Alternative 3**.

For each of the **Preferred Alternatives 2** and **3**, **Option a** is the least conservative and would have the same negative impacts to the physical and biological/ecological environment as **Alternative 1** (continued potential harm to corals due to bottom-tending gear). **Preferred Option b** would provide the most protection to corals and other organisms in the vicinity of the area in **Preferred Alternatives 2** and **3,** as **Preferred Option b** restricts fishing with bottom-tending gear and would eliminate interactions between this type of gear and any benthic species or habitats found in the sites proposed in Action 6.

4.5.2 Direct and Indirect Effects on the Economic Environment

Selection of **Alternative 1** would not be expected to result in any direct or indirect economic impacts. Selection of **Preferred Alternatives 2** or **3** with **Option a** would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternatives 2 and **3** with **Preferred Option b** would create the new HAPCs named Harte Bank and Southern Bank, with a prohibition on fishing with bottom-tending gear. Minimal negative direct economic effects would be expected to result. Examination of VMS pings along with shrimp ELB data suggests that the area is not a primary shrimping ground but rather a transit area. Recreational fishing could also potentially be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by protecting coral and also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity.

The alternatives can also be analyzed in terms of shark bottom longline observer data, the number of ELB data points and unique vessels, as well as the number of VMS data points and unique vessels. The Harte Bank HAPC (**Preferred Alternative 2**) had 11 ELB data points and 4 unique vessels from 2004-2013. There were 274 VMS data points and 8 unique vessels from 2007-2015, which corresponds to an annual average of 30.4 VMS data points and 0.9 unique vessels. The Southern Bank HAPC (**Preferred Alternative 3**) had 3 ELB data points and 2 unique vessels from 2004-2013. There was 1 VMS data point and 1 unique vessel from 2007-2015. While recognizing that the presented VMS data includes both fishing and non-fishing points and therefore serves as an upper bound for potential impacts on fishing effort, **Preferred Alternative 2** had the most VMS data points and unique vessels, followed by **Preferred Alternative 3**. In terms of ELB data, which is more likely to determine fishing activity from non-fishing activity but only represents about 1/3 of federally permitted shrimp vessels, **Preferred Alternative 2** had the most ELB data points and unique vessels, followed by **Preferred Alternative 3**. Shark bottom longline observer data had no observed fishing sets in these areas from 2008 – 2016. An extremely low number of vessels participating in other HMS activity may be negatively impacted by the proposed HAPCs.

4.5.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the southwestern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2** and **3** would each create a new HAPC in the southwestern region. Minimal to no effects would be expected from **Option a** under each alternative, as an HAPC would be established with no attending restrictions on fishing or gear within each area. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

The potential for negative effects is greater under **Preferred Option b**, as all bottom-tending gear would be prohibited within the boundaries of each new HAPC. There is evidence of some limited use in the proposed Harte Bank HAPC (**Preferred Alternative 2**) by vessels with shrimp permits, but these vessels may be transiting the area, rather than trawling, and would not be affected as long as bottom-tending gear was not in use. There is even less evidence of human activity that would be affected by the fishing and gear restrictions under **Preferred Option b** within the proposed Southern Bank HAPC (**Preferred Alternative 3**). Thus, any effects would be minimal to none in establishing the Harte Bank (**Preferred Alternative 2**) or Southern Bank (**Preferred Alternative 3**) HAPCs with attending prohibitions on bottom-tending gear compared to **Alternative 1**.

4.5.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 (No Action) would have no impact on the administrative environment as it maintains the status quo. The same is true for **Option a** in **Preferred Alternatives 2** and **3,** as this option for these alternatives attaches an HAPC label to these sites, but would not confer any fishing regulations. **Preferred Option b** for **Preferred Alternatives 2** and **3** would require an additional administrative burden of developing and implementing fishing regulations for prohibiting bottom-tending gear. Identification of EFH, HAPCs or potential restrictions on fishing activities may have some impact on other federal laws and policies. The implementation of a number of federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPC to the fish species managed by the Council and NMFS. The designation of EFH requires other federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.6 Action 6 – New Deep-water Coral Areas for HAPC Status Not Recommended to Have Fishing Regulations.

Alternative 1: No Action. Do not establish any new deep-water coral HAPCs.

Preferred Alternative 2: Establish a new HAPC named South Reed bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
South Reed	A	83°56.220’	24°40.870’
Depth Range:	B	83°53.360’	24°40.926’
1314-4920 ft	C	83°53.300’	24°38.313’
(219-820 fathoms)	D	83°56.159’	24°38.257’
Area: 6.8 nm^2	A	83°56.220’	24°40.870’

Preferred Alternative 3: Establish a new HAPC named Garden Banks 299 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Bank 299	A	92°14.635’	27°42.963’
Depth Range:	B	92°11.697’	27°42.946’
1314-1968 ft	C	92°11.703’	27°40.457’
(219-328) fathoms	D	92°14.652’	27°40.435’
Area: 6.5 nm^2	A	92°14.635’	27°42.963’

Preferred Alternative 4: Establish a new HAPC named Garden Banks 535 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Garden Banks 535	A	93°36.825’	27°27.314’
Depth Range:	B	93°33.894’	27°27.326’
1638-1968 ft	C	93°33.880’	27°24.711’
(273-328 fathoms)	D	93°36.811’	27°24.699’
Area: 6.8 nm^2	A	93°36.825’	27°27.314’

<u>Preferred Alternative 5</u>: Establish a new HAPC named Green Canyon 140 and 272 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 140/272 Depth Range: 984-3282 ft (164-547 fathoms) Area: 81.6 nm^2	A	91°36.342’	27°50.510’
	B	91°30.460’	27°50.448’
	C	91°30.496’	27°47.834’
	D	91°24.616’	27°47.768’
	E	91°24.654’	27°45.154’
	F	91°27.593’	27°45.187’
	G	91°27.666’	27°39.959’
	H	91°36.475’	27°40.052’
	I	91°36.442’	27°42.666’
	J	91°39.379’	27°42.695’
	K	91°39.347’	27°45.310’
	L	91°36.408’	27°45.281’
	M	91°33.470’	27°45.251’
	N	91°33.435’	27°47.865’
	O	91°36.375’	27°47.895’
	A	91°36.342’	27°50.510’

<u>Preferred Alternative 6</u>: Establish a new HAPC named Green Canyon 234 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 234	A	91°15.798’	27°47.662’
Depth Range:	B	91°12.859’	27°47.625’
1314-2952 ft	C	91°12.944’	27°42.397’
(219-492 fathoms)	D	91°15.881’	27°42.434’
Area: 13.6 nm^2	A	91°15.798’	27°47.662’

<u>Preferred Alternative 7</u>: Establish a new HAPC named Green Canyon 354 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Green Canyon 354	A	91°51.185’	27°37.572’
Depth Range:	B	91°48.249’	27°37.547’
1638-3282 ft	C	91°48.278’	27°34.932’
(273-547 fathoms)	D	91°51.212’	27°34.957’
Area: 6.8 nm^2	A	91°51.185’	27°37.572’

<u>Preferred Alternative 8</u>: Establish a new HAPC named Mississippi Canyon 751 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 751	A	89°49.883'	28°12.710'
Depth Range:	B	89°46.934'	28°12.770'
1968-2298 ft	C	89°46.866'	28°10.158'
(328-383 fathoms)	D	89°49.814'	28°10.098'
Area: 6.8 nm^2	A	89°49.883'	28°12.710'

<u>Preferred Alternative 9</u>: Establish a new HAPC named Mississippi Canyon 885 bound by the following coordinates, connecting in order:

Area	Point	Longitude (West)	Latitude (North)
Mississippi Canyon 885	A	89°43.787'	28°04.993'
Depth Range:	B	89°40.841'	28°05.051'
1314-1968 ft	C	89°40.777'	28°02.439'
(219-328 fathoms)	D	89°43.721'	28°02.381'
Area: 6.8 nm^2	A	89°43.787'	28°04.993'

4.6.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Alternative 1 (No Action) would have the same effects on the physical and biological/ecological environments as each of the other alternatives in this action; specifically, any bottom-tending fishing effort that occurs in the areas proposed in Action 6 would continue to negatively impact the coral and associated species at these sites. However, due to the depths, it's unlikely that any fishing takes place on these sites; therefore, changes to the physical or biological environments are similarly unlikely. Fishing is not currently occurring in these areas, but should fishing effort shift into these areas, impacts from fishing gear on the bottom could be anticipated. At this time, these impacts are unlikely.

Preferred Alternatives 2 through **9** each have the same effects on the physical and biological environments in their corresponding areas. These HAPCs would not have fishing regulations, but are under consideration for HAPC status because they contain communities considered rare. There would be no changes to the physical and biological environments in these areas if any or all of **Preferred Alternatives 2** through **9** were selected. The depths of these areas restrict fishing effort with bottom-tending gear.

4.6.2 Direct and Indirect Effects on the Economic Environment

Establishing these proposed new HAPCs would not be expected to result in any direct economic impacts. These new HAPCs may result in indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

4.6.3 Direct and Indirect Effects on the Social Environment

No additional effects would be expected from **Alternative 1**, as no new HAPCs would be established in the southwestern region. Establishing an HAPC does not result in positive or negative effects. Rather, regulations established for an HAPC may affect human activity by prohibiting fishing or the use of certain gear, including anchoring. **Preferred Alternatives 2-9** would each create a new HAPC in the Gulf. Minimal to no effects would be expected from each alternative, as no attending restrictions on fishing or gear would be established for any of the proposed HAPCs. It is possible that fishing or gear prohibitions could be established for these HAPCs in the future, resulting in negative effects if human activity is disrupted.

4.6.4 Direct and Indirect Effects on the Administrative Environment

Alternative 1 would have no effect on the administrative environment because nothing further would be required. **Preferred Alternatives 2** through **9** would have analogous effects on the administrative environment because these areas already require EFH consultations, but would not require any associated fishing regulations. As HAPCs are a subset of EFH, and these areas are already considered coral EFH, it is unlikely that there would be much additional administrative burden. Identification of EFH, HAPCs, or potential restrictions on fishing activities may have some impact on other federal laws and policies. The implementation of a number of federal, state, and local laws, regulations, and policies have a direct effect on habitat and waters that may be considered EFH or HAPCs to the fish species managed by the Council and NMFS. The designation of EFH requires other federal agencies with responsibility for proposed non-fishing actions to consult with NMFS on actions with potential adverse impacts on EFH. As a subset of EFH, HAPCs require these consultations.

4.7 Action 7 – Prohibit Dredge Fishing In All Existing HAPCs That Have Fishing Regulations

Alternative 1: No Action. No new dredge fishing specific management measures will be implemented for established HAPCs. Areas with dredge fishing restrictions already in place will retain those restrictions.

Preferred Alternative 2: Prohibit dredge fishing in all HAPCs that have fishing regulations.

4.7.1 Direct and Indirect Effects on the Physical and Biological/Ecological Environments

Alternative 1 would retain status quo. At this time dredge fishing, as a fishing method, is not known to occur in federal waters of the Gulf, and it is not anticipated to be used in the future. **Preferred Alternative 2** would be a proactive measure to prevent fishing via dredge fishing in HAPCs should that method become viable in federal waters of the Gulf. Dredge fishing, as a fishing gear type that interacts with the seafloor, has the potential to damage or remove benthic resources indiscriminately. Therefore, prohibition of this type of activity within areas identified as HAPCs would inherently be beneficial and reduce or eliminate direct and indirect impacts to the physical and biological/ecological environment.

4.7.2 Direct and Indirect Effects on the Economic Environment

The decision to prohibit dredge fishing in currently established HAPCs is not expected to result in direct or indirect economic effects, as dredge fishing is not a type of fishing that occurs in the Gulf EEZ. Thus, this action is administrative in nature, such that it provides consistent management measures across all currently existing HAPCs with fishing regulations.

4.7.3 Direct and Indirect Effects on the Social Environment

Currently, there is no dredge fishing known to occur in the Gulf EEZ. Thus, no effects would be expected from either adding dredge fishing to the list of bottom-tending gear that are prohibited in existing HAPCs (**Preferred Alternative 2**) or allowing the list of bottom-tending gear to continue to not include dredge fishing (**Alternative 1**).

4.7.4 Direct and Indirect Effects on the Administrative Environment

Because dredge fishing as a fishing method does not currently occur in the Gulf, prohibiting dredge fishing is unlikely to have negative effects on the administrative environment. **Alternative 1** would be the least beneficial because HAPC fishing regulations in the Gulf would continue to be inconsistent. **Preferred Alternative 2** would be beneficial due to the improved consistency of HAPC fishing regulations in the Gulf. Instating the same management measures across all HAPCs reduces confusion for fishermen, law enforcement, and resource managers.

4.8 Cumulative Effects Analysis (CEA)

As directed by the National Environmental Policy Act (NEPA), federal agencies are mandated to assess indirect and direct impacts and cumulative impacts of actions. NEPA defines a cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. 1508.7). Cumulative effects can either be additive or synergistic. A synergistic effect is when the combined effects are greater than the sum of the individual effects.

This section uses an approach for assessing cumulative effects that was initially used in Amendment 26 to the Reef Fish fishery management plan (FMP) and is based upon guidance offered in the Council on Environmental Quality's (CEQ) Considering Cumulative Effects handbook (1997). The report outlines 11 items for consideration in drafting a CEA for a proposed action.

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope of the analysis.
3. Establish the timeframe for the analysis.
4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.
6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
7. Define a baseline condition for the resources, ecosystems, and human communities.
8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
9. Determine the magnitude and significance of cumulative effects.
10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
11. Monitor the cumulative effects of the selected alternative and adapt management.

Cumulative effects on the biophysical environment, socio-economic environment, and administrative environments are analyzed below.

1. Identify the significant cumulative effects issues associated with the proposed actions and define the assessment goals.

The CEQ cumulative effects guidance states this step is accomplished through three activities as follows:

I. The direct and indirect effects of the proposed actions (Section 4.1 – 4.7);
II. Which resources, ecosystems, and human communities are affected (Chapter 3); and

III. Which effects are important from a cumulative effects perspective (information revealed in this CEA).

The direct and indirect effects of the proposed actions are fully described and analyzed in Sections 4.1 -4.7. The resources, ecosystems, and human communities that are affected are fully described in Chapter 3. The important effects from a cumulative perspective are analyzed and discussed in the following sections.

2. Establish the geographic scope of the analysis

The actions in this amendment would primarily affect the physical and biological/ecological environments of the Gulf. All areas analyzed have species included in the Coral FMP, warranting designation as HAPCs because all of these areas are sensitive to human-induced impacts through direct impacts or mortality to coral colonies, and indirectly from impacts to the physical environment for those colonies.

The geographic scope affected by these actions is described in Chapter 3 of this document, in the Final EFH Environmental Impact Statement (GMFMC 2004); the Generic Amendment Number 3 for Addressing EFH Requirements, HAPCs, and Adverse Effects of Fishing in FMPs of the Gulf (GMFMC 2005). The geographic scope pertains directly to federal waters of the Gulf. The area for federal waters of the Gulf, using the latest Submerged Lands Act (SLA) boundary is approximately 182,752.6 nm^2. The SLA boundary is measured from the baseline for the SLA to approximately nine nautical miles off of Texas and Florida, and three nautical miles off Louisiana, Mississippi, and Alabama. For reef fish, the state and federal boundary is at nine nautical miles off each state. Specifics about each of the areas are discussed within the alternatives in Chapter 2 of this document.

3. Establish the timeframe for the analysis

The timeframe for this analysis is 1984 to 2022. On August 22, 1984, NOAA issued the final rule to implement the original Coral FMP. The rule was prepared jointly by the Council and South Atlantic Fishery Management Council (South Atlantic Council) due to the susceptibility of coral and coral reefs to physical and biological degradation, and the need to optimize the benefits from these resources while conserving the coral and coral reefs. The management unit consisted of the coral and coral reefs in federal waters including hard bottom, deep-water banks, patch reefs, and outer bank reefs. In 1994, Amendment 2 to the Coral FMP separated the FMP into two FMPS, one managed by the South Atlantic Council and one managed by the Gulf Council. The original FMP addressed three objectives:

1) Established unique HAPC for coral which were currently or potentially threatened;
2) Prohibited the taking or destruction of stony corals and sea fans (*Gorgonia flabellum* and *Gorgonia ventalina*), except under scientific permit; and
3) Provided permit systems for the taking of certain corals for scientific and educational purposes and harvesting fish or other marine organisms using toxic chemicals in coral habitat.

The identification and management of corals and coral reefs of the Gulf have periodically been reviewed and analyzed since 1998. The Generic EFH Amendment identified and described EFH based on known distributions of corals specified in the Coral FMP (GMFMC 1998). The amendment identified threats to EFH from fishing and non-fishing activities, proposed options to conserve and enhance EFH, and identified research needs. No management measures were implemented through this amendment. The Generic Amendment Addressing the Establishment of the Tortugas Marine Reserves established marine reserves in the vicinity of the Dry Tortugas, based on the significant marine resources (GMFMC 2001). Generic Amendment 3 addressed a court finding that the environmental assessment for the original amendment did not comply with the requirements of NEPA, requiring NMFS to prepare a more thorough analysis. The amendment established additional HAPCs, restricted fishing activities within HAPCs to protect EFH, and required a weak link in bottom trawl gear to protect EFH.

The most recent review of deep-water coral and coral areas was completed by the Coral Working Group, convened by the Council in 2014 (Appendix A). The following is a list of current and reasonably foreseeable future management actions pertaining to coral and coral reefs. They are also described in Step 4.

- In April 2017, the Council passed a motion to add an amendment, subsequent to Amendment 9 (this document), that would address the areas proposed by the Coral Working Group that were not included in this document. The 24 areas not included in this amendment include existing HAPCs that do not currently have fishing regulations, and include some areas under consideration for the Flower Garden Banks National Marine Sanctuary (FGBNMS). Should this amendment go forward, it would not likely be implemented until 2022.
- The FGBNMS is proposing to add additional banks that are comprised of approximately 289 nm^2 of coral and coral reef habitat. The timeline for this effort is uncertain, but the draft environmental impact statement (EIS) has already been presented at public hearings.
- In 2011, the Florida Keys National Marine Sanctuary (FKNMS) began a marine zoning and regulatory review process. In 2012, scoping meetings were conducted to review the boundaries, regulations, and zoning scheme. The FKNMS is currently analyzing information and developing alternatives.

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern

Past actions affecting coral and coral reefs are summarized in Section 1.3.

a. The following are Coral FMP related actions and activities

i. The following are past actions and activities

- In 2001, the Generic Tortugas Amendment established marine reserves in the vicinity of the Dry Tortugas, Florida, based on the significant marine resources. The amendment established fishing regulations under the Magnuson-Stevens Fishery Management Act (Magnuson-Stevens Act) within portions of the reserve that resides in federal waters.

The regulations prohibit fishing for any species and anchoring by fishing vessels is within the Dry Tortugas marine reserves.

- In 2004, the Final EFH EIS defined EFH for the Coral FMP as consisting of the total distribution of coral species and life stages throughout the Gulf including the East and West Flower Garden Banks, Florida Middle Grounds, southwest tip of the Florida reef tract, and predominant patchy hard bottom offshore of Florida from approximately Crystal River south to the Keys, and scattered along the pinnacles and banks from Texas to Mississippi at the shelf edge
- In 2005, Generic Amendment 3 established additional HAPCs, restricted fishing activities within HAPCs to protect EFH, and required a weak link in bottom trawl gear to protect EFH. The East and West Flower Garden Banks HAPC prohibits fishing with a bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels within those areas. The Pulley Ridge HAPC, Stetson Bank HAPC, and McGrail Bank HAPC, prohibit fishing with a bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels in those areas. These actions also reduced impacts to corals and coral reefs.

ii. The following are current actions and activities

- None at this time.

iii. The following are reasonably foreseeable future actions (RFFA) and activities

- In April 2017, the Council discussed including all 47 areas that were proposed by the 2015 Coral Working Group in this Amendment 9. However, there was concern that adding all of the areas would be interpreted as disingenuous to the fishermen who participated in the advisory panel (AP) meetings, as they were tasked with reviewing and prioritizing areas and they expected that the number of areas would be limited to the priority areas they proposed. It was also discussed that trying to address 47 areas in one amendment would be a significant undertaking and would take a long time to implement, and potentially be duplicative in the case of areas under consideration for inclusion into the FGBNMS expansion. Therefore, the Council passed a motion to add an amendment, subsequent to Coral Amendment 9 (this document), that would address the areas proposed by the Coral Working Group that were not included in this document. The 24 areas not included in this amendment encompass existing HAPCs that do not currently have fishing regulations, and include some areas under consideration for the FGBNMS. The 24 areas could include proposing approximately 413 nm^2 of coral areas as HAPCs.

b. The following are non-Coral FMP actions and activities

i. The following are past actions and activities

- Fisheries in the Gulf are managed under several FMPs; Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP), Fishery Management Plan for the Red Drum Fishery of the Gulf of Mexico (Red Drum FMP), Fishery Management Plan for the Coastal Migratory Pelagics Fishery of the Gulf of Mexico and Atlantic

Region (Coastal Migratory Pelagics FMP), Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico (Shrimp FMP), Fishery Management Plan for Spiny Lobster in the Gulf of Mexico and the South Atlantic (Spiny Lobster FMP). Many fishing regulation actions have been implemented through these FMPs to be in accordance with the Magnuson-Stevens Act, and sustainably manage the fisheries of the Gulf. As such, measures such as bag limits, gear restrictions, seasonal closures, etc. have all impacted fishing communities throughout the Gulf. While some management measures negatively impact fishing communities, as well as the economic and social environments in the short term, they are implemented in order to achieve optimum sustainable yield and to be a benefit to the fishing, economic, and social environments in the future.

- The *Deep-water Horizon* MC252 oil spill impacted more than one-third of the Gulf and severely impacted the mesophotic and deep-sea coral communities in the Gulf (NOAA 2010). Deep-water corals are particularly vulnerable to episodic mortality events such as oil spills because corals are immobile. In addition to the crude oil, over one million gallons of the dispersant, Corexit 9500A®, was applied to the ocean surface and an additional hundreds of thousands of gallons of dispersant were pumped to the mile-deep well head (National Commission 2010). Severe health declines were observed in three deep-water coral species in response to dispersant alone (2.3–3.4 fold) and the oil–dispersant mixtures (1.1–4.4 fold) compared to oil-only treatments (DeLeo et al. 2015). Increased dispersant concentrations appeared to exacerbate these results. Hundreds of thousands of gallons of dispersant were applied near the wellhead during the *Deep-water Horizon MC252* oil spill, likely negatively impacting the corals. Several studies have documented declines in coral health or coral death in the presence of oil from the oil spill (White et al. 2012; Hsing et al. 2013; Fisher et al. 2014). Sites as far as 11 km southwest of the spill were documented to have greater than 45% of the coral colonies affected by oil (White et al. 2012; Hsing et al. 2013), and, though less affected, a site 22 km in 1900 m of water had coral damage caused by oil (Fisher et al. 2014). Coral colonies presented widespread signs of stress, including varying degrees of tissue loss, sclerite enlargement, excess mucous production, bleached commensal ophiuroids, and being covered by brown flocculent material. Coral colonies from several areas around the wellhead had damage to colonies that seemed to be representative of microdroplets as all colonies were not affected, and colonies that were affected had patchy distributions of damaged areas (Fisher et al. 2014). Because locations of deep-sea corals are still being discovered, it is likely that the extent of damage to deep-sea communities will remain undefined.

ii. The following are current activities and actions

- In February 2015, NOAA published a Notice of Intent to consider possible expansion of the FGBNMS and asked the public for input on potential boundaries, resources to be protected, issues NOAA should consider, and any information that should be included in the resource analysis. The potential impacts of the FGBNMS expansion are detailed in Chapter 5 of the FGBNMS Expansion Draft Environmental Impact Statement (FGBNMS Expansion DEIS) and incorporated here by reference (2016). NOAA's preferred alternative for the expansion of FGBNMS consists of modifying (expanding) the existing Stetson Bank boundary and incorporating East and West Flower Garden Banks into a single new habitat complex which would include Horseshoe Bank. The preferred alternative would also establish seven new discontiguous boundaries encompassing seven individual banks (McGrail, Geyer, Sonnier, Alderdice, MacNeil, Elvers and Parker) and two additional habitat complexes inclusive of multiple reefs and banks (the Bright-Rankin-28 Fathom complex and the Bouma-Bryant-Rezak-Sidner complex) (Figure 4.8.1).

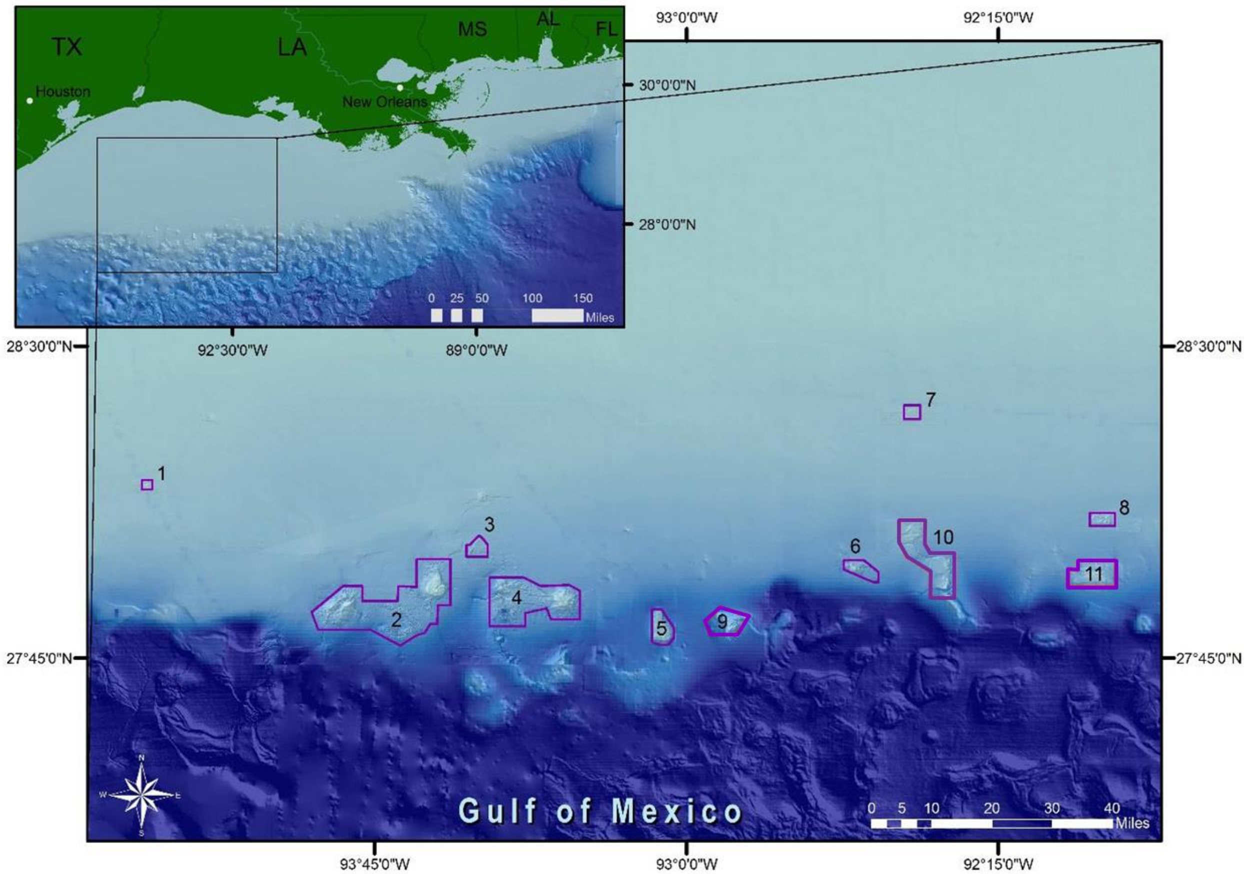

Figure 4.8.1. Map from the FGBNMS Expansion DEIS showing the proposed areas for staff recommended preferred alternative 3. Areas are numbered as shown in Table 4.8.1 (FGBNMS Expansion DEIS 2016).

NOAA's preferred alternative would result in a 289.3 nm^2 sanctuary (including the existing sanctuary) (Table 4.8.1). Based on the draft EIS, no significant adverse impacts to resources or the human environment are expected from expanding FGBNMS under any alternative evaluated to accomplish the proposed action, either individually or cumulatively when added to other past, present, and reasonably foreseeable future actions. Environmental consequences are proportional to the number of features and areal extent encompassed under each alternative. NOAA's preferred option provides the greatest environmental benefit that can be managed with current FGBNMS operational capacity and budgetary resources. Long-term beneficial impacts are anticipated if the proposed action is implemented.

Table 4.8.1. FGBNMS expansion area names and sizes in nm^2, of the 2016 preferred alternative 3. Area numbers are associated with the image in Figure 4.8.1.

Area Number	**Name**	**Area (nm^2)**
1	Stetson Bank Expansion	1.7
2	West Flower Garden Bank, East Flower Garden Bank and Horseshoe Bank Expansion	111.3
3	MacNeil Bank	6.3
4	Rankin Bank, 28 Fathom Bank and Bright Bank	62.7
5	Geyer Bank	11.5
6	McGrail Bank	9.1
7	Sonnier Bank	4.2
8	Alderdice Bank	6.0
9	Elvers Bank	15.2
10	Bouma Bank, Bryant Bank, Rezak Bank and Sidner Bank	40.4
11	Parker Bank	20.9
Net Increase in Area Over Current FGBNMS		**246.9**
Total Area including FGBNMS		**289.3**

The proposed alternatives limit commercial fishing, and would establish regional closures of fishing grounds, other than hook and line, which could impact other fishery management activities arising from the review process by the GMFMC. The impacts on commercial fishing from the regulations were identified as minor. The proposed alternatives would not result in the prohibition of offshore oil and gas development in the expansion area. The impacts to exploration, are identified as minor due to the fact that the Bureau of Ocean Engineering Management (BOEM) lease sales and the associated leasing stipulations and mitigations attached to permits already protect topographic features.

- Oil, gas, and mineral mining and renewable energy installation activities which directly interact with coral areas can all impact deep-water coral communities. Impacts can include those directly to the physical environment by denuding, rubbelizing, burying, or covering substrate. Direct impacts to coral-fishery management unit (FMU) listed species can include partial to full mortality of a colony through breakage or removal from the substrate or suffocation.
- In June 2018 The Council requested that NMFS Highly Migratory Species (HMS) division implement bottom-tending gear rules consistent with those in this amendment. The proposed alternatives would impact both commercial and recreational fishermen with HMS permits that use bottom-tending gear to prosecute that fishery. The impacts specific to the HMS shark fishery were identified as minor (Section 1.1 and Section 3.1.4). It is unknown how these regulations may affect other HMS permit holders.

iii. The following are RFFA and activities

- The FGBNMS is proposing to add additional banks that are comprised of approximately 289 nm^2 of coral and coral reef habitat. The timeline for this effort is uncertain, but the draft environmental impact statement (EIS) has already been presented at public hearings.

- The potential impacts of climate change on the deep-water coral community is qualitatively discussed in the NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems (2010). These slow-growing long-lived organisms have a carbonaceous or proteinaceous skeleton. It is likely that changes in ocean acidification could impact the growth rate and composition of the skeleton in addition to the geographic range of suitable habitat and depth for colonization. Climate change is also likely to change deep sea temperatures as well as currents (Lumsden et al. 2007). During the period from 1961 to 2003, global ocean temperature has risen by 0.1°C from the surface to a depth of 700 m (Bindoff et al. 2007), the region where many deep corals are found. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change concluded that ocean warming has affected deep-sea ecosystems at least down to 2,000 m. Effects of warming on deep-sea coral and sponge communities include direct impacts on survival and an array of indirect effects linked to increasing water temperature. These include decreased dissolved oxygen concentrations, altered hydrodynamics, or decreased productivity of surface waters and export of food to the deep-sea (Hourigan et al. 2017). Thermohaline circulation is the major driving force behind currents in the deep ocean. A weakening of this process could reduce transport of food and oxygen to deep coral communities and eventually alter the structure of deep sea ecosystems. It is unclear how these changes might affect deep corals (Lumsden et al. 2007). A change in deep ocean currents could affect deep-sea coral distribution or may stress species not able to adapt to warmer temperatures. While the potential impacts are not quantifiable at this time, climate change and ocean acidification further contribute to the cumulative effects on the resource and should be considered for management strategies and conservation planning.

5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress

a. Socioeconomic driving variables identifying the types, distribution, and intensity of key social and economic activities within the region

The socioeconomic driving variables identifying the types, distribution, and intensity of key economic and social activities within the region are described in detail in Sections 2.1-2.7, Subsection 4 and 5, respectively; and Section 4.1-4.7 Subsection 2 and 3, respectively.

b. Indicators or stress specific resources, ecosystems, and communities

i. Deep-water Corals and Coral Reef

Corals and coral reefs are particularly sensitive to physical impacts because of their fragile structure and slow growth rates. In general, direct impact to corals could cause immediate mortality to the colony, weaken the colony making it more susceptible to other stressors such as disease or predation, or cause injury which take tens to hundreds of years to repair if at all. Direct impacts to the habitat include causing the solid substrate to be broken into smaller pieces (rubbelization), which can prevent coral colonies from settling on the pieces of rubble, or if they do settle there is a chance that rubble will shift, causing coral colony mortality. Additionally, the direct impacts to the substrate can include burial, reducing the available area for corals to settle and grow. Various anthropogenic activities can cause this stress, including fishing gear impacts; oil, gas, and mineral exploration and mining; oil, gas, mineral, and renewable energy installations including the cables or pipelines which transfer material; and anchoring from the shipping industry. The coral colonies and habitat are not likely to recover from direct physical impact, or prolonged indirect physical impact.

Corals and coral reefs are also impacted indirectly from other anthropogenic stressors such as pollution and marine debris. Marine debris can include individual pieces of trash, to larger items such as the loss of construction materials or shipping containers. Smaller pieces of debris may abrade a colony, whereas larger pieces are likely to cause immediate mortality. Pollution impacts can include spills of various chemicals (see Section 4.b.i of this CEA), or the steady buildup of nutrients in the water body.

Every summer in the northern Gulf, a large hypoxic zone forms. The seasonal layering of the water is temperature and salinity dependent and prevents the mixing of higher oxygen surface water with oxygen-poor bottom water. The "dead zone" refers to Gulf waters where 2 parts per million or less of oxygen are measured. For 2015, the extent of the hypoxic area was estimated to be 6,474 square miles and is similar to the running average for the past 5 years of 5,543 square miles (Figure 4.8.2). The hypoxic conditions in the northern Gulf indirectly impact less mobile benthic macroinvertebrates (e.g., polychaetes) by influencing density, species richness, and community composition (Baustian and Rabalais 2009). Likewise, corals have oxygen thresholds and could be stressed, or eventually die, by an event such as this seasonal hypoxic zone in coral areas.

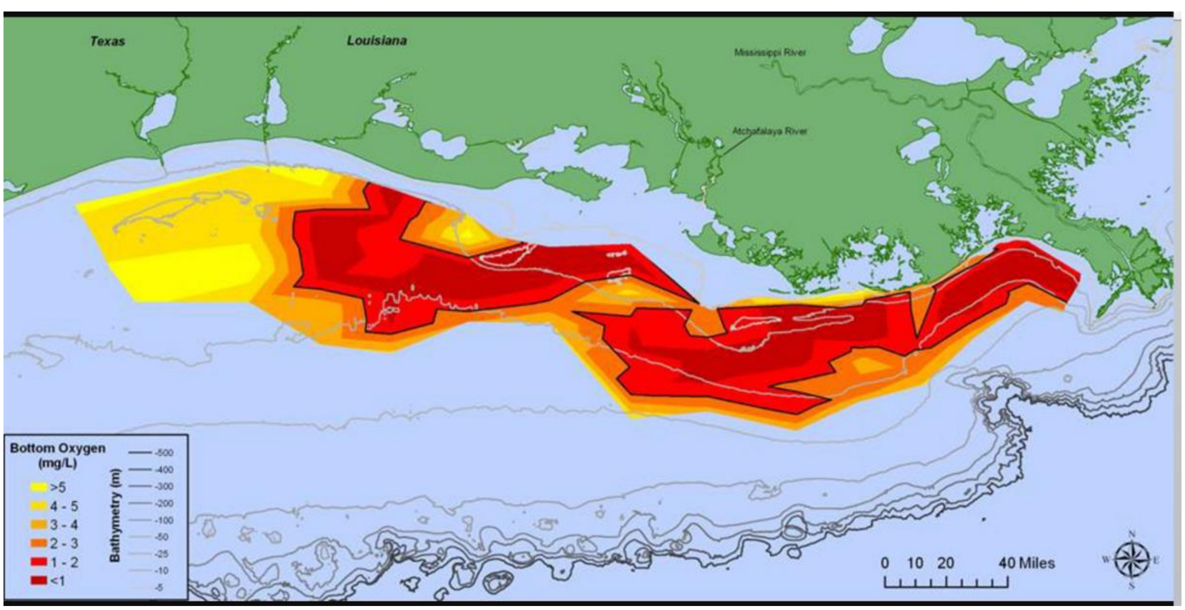

Figure 4.8.2. Map showing distribution of bottom-water dissolved oxygen from July 28 to August 3, 2015 west of the Mississippi River delta. Black lined areas – areas in red to deep red – have less than 2 milligrams per liter of dissolved oxygen.
Source: Nancy Rabalais, LUMCON; R. Eugene Turner, LSU. Credit: NOAA.[33]

As described in Section 4.b.i of this CEA, the Deep-water Horizon MC252 incident affected more than one-third of the Gulf (NOAA 2010). The impacts of the oil spill on the physical and biological environments are expected to be significant and may be long-term. Stressors to the corals could include direct mortality and recruitment failure. Because the extent of deep-water ecosystems has yet to be mapped, it will be difficult to quantify the entire impact or the recovery from the oil spill.

The potential stressors from climate change could shift fishing effort in the Gulf as ocean temperatures change, potentially changing fish spawning areas or seasons. Fishing which does not currently occur in the deeper areas being designated as HAPCs, could shift into those areas if targeted fish migrate to deeper, cooler waters. Designating the deeper areas where fishing does not currently occur as HAPCs with fishing regulations has the potential to reduce stress from shifting fisheries due to climate changes. Designating the deeper areas where fishing does not currently occur as HAPCs without fishing regulations, can assist fishermen in avoiding those areas now and in the future (to prevent gear loss) and assist in monitoring those areas in the future for new impacts. Additionally ocean acidification does and will continue to stress the ability of corals to produce their skeleton, which may lead to colonies being more fragile than in the past and potentially unable to recover from direct impacts. Therefore, corals do not have the ability to withstand the stresses of ocean acidification, and their ability to withstand direct stresses from climate change (such as warming sea temperatures) is unknown.

ii. Ecosystems

Stresses to the ecosystem would be the same as many of the stressors mentioned in Section 5.a.i of this CEA addressing corals and coral reefs. The most diverse deep-water coral reef ecosystem known occurs in the Southeastern U.S. and Gulf (Hourigan et al. 2017). Habitats formed by, and associated with, corals and sponges have been identified as priorities for deep-sea conservation in the U.S. (NOAA 2010) and internationally (Convention on Biological Diversity 2008; Food and Agriculture Organization 2009). The ecosystem is comprised of the deep-water corals, sponges, and the other species they support. The corals, sponges, and octocorals provide habitat, vertical relief and structure, and food across the ocean floor for other species in the ecosystem.

These ecosystems are sensitive to direct physical impacts that essentially remove or compromise the habitat and vertical structure. When an ecosystem experiences a direct impact that removes older, longer lived species such as corals and sponges, there is the possibility those areas will also experience rubbleization or sediment impacts which prevent corals and sponges from repopulating the area. In particular, these ecosystems and refugia

[33] http://www.noaanews.noaa.gov/stories2015/080415-gulf-of-mexico-dead-zone-above-average.html

for bottom-dwelling species can be stressed from impacts by fishing gear; oil, gas, and mineral exploration and mining; oil, gas, mineral, and renewable energy installations including the cables or pipelines which transfer material; and anchoring from the shipping industry.

The ecosystem is also impacted indirectly from other anthropogenic stressors such as pollution and marine debris in ways similar to those described for corals and coral reefs in Section 5.a of this CEA. In regards to marine debris, the mobile organisms in the ecosystem (e.g. crabs, fish, etc.) can most likely leave the area and survive, and some organisms which are subsurface may not be impacted (e.g. polychaetes). As described in Section 5.a of this CEA, every summer in the northern Gulf, a large hypoxic zone forms. These events can impact ecosystems by causing mortality to benthic species that are not motile. However, more mobile macroinvertebrates and demersal fishes are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, although not directly affected, these organisms are indirectly affected by limited prey availability and constrained available habitat (Craig 2012). As described in Section 4.b.i of this CEA, the Deep-water Horizon MC252 incident affected more than one-third of the Gulf (NOAA 2010). The impacts of the oil spill on the ecosystem are expected to be significant and may be long-term. Stressors to the ecosystem could include motile organisms leaving the area, benthic organism recruitment failure, direct mortality of benthic organisms, and impacts to the physical environment through smothering of the substrate. Because the extent of deep-water ecosystems was not fully understood before the oil spill, it will be difficult to quantify the impact or the recovery.

As described in Section 4.b.ii and 5a of this CEA, climate change may also be a stressor to the ecosystem. Warming temperatures may influence the distribution of both benthic and pelagic organisms. Also, since ocean acidification affects corals' ability to produce their skeleton, the continued construction of deep-water reefs may be compromised. It is uncertain the prolonged impact and stress this will have on the ecosystem.

Fishing activity can stress the overall ecosystem when a component of the ecosystem is removed to the extent that it no longer provides its function within the community. Removal of a species can sometimes cause phase shifts in the ecosystem, and while this has been well documented on land, for example the role of the American bison (Knapp et al. 1999), less is known about the impacts of individual species removal from a marine ecosystem. However, recent research in shallow water coral areas has shown some evidence of phase shifts such as those that result from the removal of herbivorous fish (McClanahan et al. 2011, Hughes et al. 2007, Lewis 1986). In many cases, the ecosystem will find a new steady state or can potentially return to its original state if the removed organism returns.

iii. Fish and Shrimp Fisheries and Fishing Communities

Many stressors to fisheries and the fishing community are the same as those mentioned in the Section 5.a.i and 5.a.ii of this CEA, although in some instances, direct stressors to corals or the ecosystem are indirect stressors to fisheries and fishing communities. Fisheries that harvest species that rely on coral reefs for part of their life history can be indirectly stressed due to physical impacts to that habitat. Direct impacts to the habitat include denuding the area of benthic organisms that can be an important source of food or habitat for fish. Additionally, the solid substrate can be broken into smaller pieces (rubbelization), reducing vertical relief and habitat for some fish species. Various anthropogenic activities can indirectly cause this stress, including fishing gear itself; oil, gas, and mineral exploration and mining; oil, gas, mineral, and renewable energy installations including the cables or pipelines which transfer material; and anchoring from the shipping industry. While the natural habitat is not likely to quickly recover, artificial reefs and substrate provide additional habitat similar to the natural reef and still provide fishing opportunities on or near those features.

The fisheries and fishing communities are also impacted indirectly from other anthropogenic stressors such as pollution and marine debris. In regards to benthic marine debris, the motile organisms in the ecosystem (e.g. crabs, fish, etc.) can most likely leave the area and survive. However some marine debris, such as ghost traps and nets, may continue to trap and or cause mortality to fishery species. As described in Section 5.a of this CEA, every summer in the northern Gulf, a large hypoxic zone forms. This hypoxic zone can cause mortality to non-motile organisms that may serve as a source of food for fishery species, or may cover an area that is important habitat for these species. The more mobile macroinvertebrates (e.g. shrimp) and fishes themselves are able to detect lower dissolved oxygen levels and can move away from hypoxic conditions. Therefore, although not directly affected, these organisms are indirectly affected by limited prey availability and constrained available habitat (Craig 2012). As described in Section 4.b.i of this CEA, the Deep-water Horizon MC252 incident affected more than one-third of the Gulf (NOAA 2010). The direct impacts of the oil spill on the fisheries was acutely significant, closing some fisheries for a period of time. However, all fisheries have resumed normal fishing operations and it seems the fisheries were able to recover relatively quickly.

The National Ocean Service (2011) indicated that 59% of the Gulf coast shoreline is vulnerable to sea level rise. Coastal communities that support these fisheries could be impacted in the future from higher storm surges and other factors associated with sea level rise. In the southeast, general effects of climate change have been predicted through modeling, with few studies on specific species. Warming sea temperature trends in the southeast have been documented, and animals must migrate to cooler waters, if possible, if water temperatures exceed survivable ranges (Needham et al. 2012). Higher water temperatures may also allow invasive species to establish communities in areas previously unsuitable. Other potential effects of climate change in the southeast include increases in hurricane frequency and intensity, decreases in salinity, altered circulation patterns, and sea level rise, among others. Should climate change cause a shift in fish species locations within the Gulf (such as migrating to deeper cooler waters) or shifts in life history (such as time of spawning), the new HAPCs with fishing regulations preventing bottom-tending gear will prevent fishing from moving into those areas.

Fishing itself (specifically overfishing) can be a stressor on the fishery and fishing communities. However, as described in Section 4.a.i, 4.b.i, and 4.b.ii of this CEA, many fishery management plans have been implemented to manage the fishing resources of the Gulf as well as the habitat those fisheries depend on. The Magnuson-Stevens Act requires the Council and NMFS to conserve and manage the fishery resources of the Gulf to prevent overfishing, to rebuild overfished stocks, to insure conservation, to facilitate long-term protection of essential fish habitats, and to realize the full potential of the fishery resources. As such, the stress from fishing pressure on the stocks and intensity from number of fishers is continuously reviewed in order to reduce or eliminate that stressor.

Other economic stressors can affect fishing communities. Section 3.5 details the fishermen and communities associated with fisheries in the Gulf, particularly the shrimp, reef fish, and shark fisheries. Information on the top communities associated with Gulf shrimp permits and Gulf royal red shrimp endorsements can be found in Table 3.5.2.1; while top communities by the number of Gulf reef fish permits and Eastern Gulf reef fish bottom longline endorsements can be found in Table 3.5.3.1. Figures 3.5.4.1 and 3.5.4.2 provide the social vulnerability indices of the top commercial and recreational shrimp and reef fish communities. Several communities exceed the threshold of one standard deviation above the mean for all three indices (Bayou La Batre, Alabama; Brownsville, Texas; Port Arthur, Texas, and Port Isabel, Texas). Several other communities exceed the threshold of one standard deviation above the mean for any of the indices (Fort Myers, Florida; Abbeville, Louisiana; Chauvin, Louisiana; New Orleans, Louisiana; Hobucken, North Carolina; Houston, Texas; Palacios, Texas; and Port Lavaca, Texas). Information on the top communities associated with Gulf HMS permits can be found in Figure 3.5.4.1. and Figure 3.5.4.2. Figure 3.5.5.1 and 3.5.5.2 provide the social vulnerability of the top commercial and recreational shrimp and reef fish communities and the top HMS communities. Gulf fishing communities appear to be somewhat resilient given their ability to recover after the 2004 and 2005 hurricane seasons as well as from the Deep-water Horizon MC252 oil spill.

iv. Administrative Environment

The stresses to the administrative environment include those from all FMPs which include developing and implementing FMPs, to permitting, charting, and enforcement of fishery management measures. However, the administrative environment, through fishery management councils and NMFS, is structured to address these needs.

Administrative stress also includes reviewing and permitting projects and activities unrelated to fisheries that occur in the Gulf such as the development of oil, gas, mineral mining, and renewable energy installations, or other construction activities. However all of the areas are already considered EFH, and some areas already have specific regulations regarding oil, gas, mineral, and renewable energy activities (see Section 6.e of this CEA). Local, state, and federal agencies have programs in place to address this need.

Additional stresses to the administrative environment include those listed above such as anthropogenic impacts from pollution or oil spills, as well as other environmental stressors like hurricanes and climate change. Reviewing and analyzing these events, as well as implementing response efforts or management measures all contribute to administrative burden. However, in general, the current administrative environment (through local, state, and federal partnerships) is structured to respond to acute, as well as chronic, stressors.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

a. Deep-water Coral and Coral Reefs

Thresholds will not be exceeded by establishing HAPCs with or without fishing regulations, with other cumulative activities affecting coral and coral reef resources. No stressors to corals or coral reefs are associated with the proposed actions which are only beneficial to those resources.

As discussed in Section 5.b.i of this CEA, deep-water coral and coral reefs are susceptible to direct stressors such as physical impact from fishing gear or construction activities, as well as indirect stressors such as marine debris, pollution, and ocean acidification because of climate change. Those areas designated as HAPCs without fishing regulations are likely to be beneficial by assisting some fishing industries to avoid those areas (to prevent gear loss), which in turn will prevent damage to corals and coral reefs. Also designating areas as HAPCs helps to focus future research or data collection efforts in important areas. The designation of HAPCs with fishing regulations are likely to be beneficial by decreasing physical impact from fishing gear in those areas where regulations would be implemented preventing the use of bottom-tending gear.

Establishing more HAPCs would be cumulatively beneficial because more area would be identified and acknowledged as a subset of EFH particularly susceptible to human-induced impacts. In addition, those areas with fishing regulations would be more beneficial than those without because those regulations would reduce impacts from bottom-tending gear. Table 4.8.2 compares the percentage of federal Gulf waters that are currently designated as HAPCs with fishing regulations and without, alongside the areas that are proposed to be implemented as HAPCs with fishing regulations and without in this amendment. The total area of HAPCs with fishing regulations would increase from 1199.0 nm^2 to 1435.7 nm^2. The total area of HAPCs without fishing regulations would increase from 2395.0 nm^2 to 2530.7 nm^2. The total area of federal waters in the Gulf designated as HAPCs would increase from 3594.0 nm^2 to 3966.4 nm^2.

Table 4.8.2. The total area (nm^2) and percent of area of federal waters of the Gulf (as described for the SLA) currently within HAPCs, and the total area and percent of area that would be established as HAPCs by these actions.

	Area (nm^2)	**% of Gulf Federal Waters**
With Fishing Regulations		
Existing National Marine Sanctuaries, Marine Reserves, and HAPCs	1199.0	0.656%
Proposed HAPCs	236.7	0.130%
Total area of current and proposed HAPCs	**1435.7**	**0.786%**
Without Fishing Regulations		
Existing National Marine Sanctuaries, Marine Reserves, and HAPCs	2395.0	1.311%
Proposed HAPCs	135.7	0.074%
Total area of current and proposed HAPCs	**2530.7**	**1.384%**
Grand Totals		

	Area (nm^2)	% of Gulf Federal Waters
Existing National Marine Sanctuaries, Marine Reserves, and HAPCs	3594.0	1.967%
Proposed HAPCs	372.40	0.204%
Total area of current and proposed HAPCs	**3966.4**	**2.170%**

b. Ecosystems

Thresholds will not be exceeded because of the contribution of establishing HAPCs with or without fishing regulations with other cumulative activities affecting the ecosystem. As discussed in Section 5.b.ii of this CEA, the ecosystem is susceptible to direct stressors such as physical impacts from fishing gear or construction activities, and indirectly from marine debris, pollution, ocean acidification due to climate change, and fishing itself. No stressors to the ecosystem are associated with implementing the proposed actions which are only beneficial to the resource. As mentioned in Section 6.a of this CEA, establishing more HAPCs would be cumulatively beneficial. In addition, those with fishing regulations would be more beneficial than those without.

c. Fish and Shrimp Fisheries

Thresholds will not be exceeded because of the contribution of establishing HAPCs with or without fishing regulations, with other cumulative activities affecting fishery resources. No stressors to fish, shrimp, or crab stocks are associated with implementing the proposed actions, which are only beneficial to those resources.

As discussed in Section 5.b.iii of this CEA, the stressors affecting Gulf fisheries can range from indirect anthropogenic impacts such as physical impacts to the habitat from fishing gear or construction activities, pollution and marine debris, and impacts from climate change such as warming waters and rising seas; and stressors such as the pressure of the fishery itself. Natural events, such as hurricanes, may stress fisheries for a short time.

Those areas designated as HAPCs without fishing regulations are likely to be beneficial by assisting some fishing communities in avoiding those areas to prevent gear loss, which in turn will prevent damage to the habitat. Also, designating the areas helps to focus future research or data collection efforts in important areas. The designation of HAPCs with fishing regulations is likely to be beneficial by decreasing physical impact from fishing gear in those areas were regulations would be enacted preventing the use of bottom-tending gear.

Thresholds will not be exceeded because, as discussed in Section 6.a of this CEA, establishing more HAPCs would be cumulatively beneficial because more area would be identified and acknowledged as a subset of EFH particularly susceptible to human-induced impacts. Those with fishing regulations would be more beneficial than those without because those regulations would reduce impacts from bottom-tending gear.

d. Fish and Shrimp Fishing Communities

Thresholds will not be exceeded because of the contribution of establishing HAPCs with or without fishing regulations, with other cumulative activities affecting fishery resources. Some stressors to fishing communities are associated with implementing the proposed actions.

As discussed in Section 5.b.iii of this CEA, the stressors affecting Gulf fishing communities can range from indirect anthropogenic impacts such as physical impacts to the habitat from fishing gear or construction activities, pollution, and marine debris; impacts from climate change such as warming waters and rising seas; and stressors such as the pressure of the fishing community itself (overfishing or overcapacity). Additionally, some fishery management measures may stress fishing communities. Natural events, such as hurricanes, may stress the fishing community for a short time.

As shown in Table 4.8.2, the increase in the area of federal Gulf waters being designated as HAPCs is minimal. Those fishing communities that would be most stressed by the actions in this amendment would be those fishing communities that use bottom-tending gear in areas which are proposed to have HAPCs established with regulations prohibiting fishing with bottom-tending gear.

For analyses and discussion in this document about existing fishing activity, three datasets were used: the shrimp ELB dataset, VMS data from reef fish vessels with bottom-tending gear, and HMS permit data including the Shark Bottom Longline Observer data. There are no known commercial shark fishermen in these areas that are not dually permitted as commercial reef fish fishermen. Therefore, fishing activity from those dually permitted commercial shark fishermen is accounted for in the VMS data. There is no information available regarding where other HMS commercial and recreational permit holders fish. See Chapter 1, "Description of Data Used to Estimate Fishing Activity" for information about the data set and caveats.
Table 4.8.3 contains the total cumulative number of unique vessels, per proposed area, per electronic monitoring type for the years 2004-2015. The number of unique vessels cited over the 12 year period within the proposed areas ranges from no reported vessel (Garden Bank 535 and Green Canyon 354) to 52 unique vessels per area in the case of Pulley Ridge North. Appendix D provides the numbers of vessels by gear types by year. Table 3.5.4.1 and 3.5.4.2 contain the number of HMS commercial and recreational permits by Gulf state, respectively. Sections 4.1-4.6, Subsection 2 provide the more specific comparison of the effects of the alternatives on the fishing fleets.

Declines in effort in these areas over the years may be a signal of stress within the fishery as fleets shift fishing locations. This could be due to natural disasters or anthropogenic disturbances; however, for those proposed areas that appear to be repeatedly fished (Pulley Ridge, Alabama Alps, L&W Pinnacles and Scamp Reef, Roughtongue Reef, Viosca Knoll 862/906, Harte Bank, and Green Canyon 140 and 272), the numbers of unique vessels do not vary substantially.

Some commercial fishing operations have been declining as a whole. Although this could be an indicator of stress in the fishery, various commercial fisheries have undergone several management changes such as permit moratoriums and individual fishing quota programs, all with the goal of reducing overcapacity in fisheries. Therefore, any effort reduction may be reflecting this purposeful reduction through management. Table 3.4.2.1 provides the number of vessels and characteristics of participation in the Gulf shrimp fisheries, and Table 3.4.3.1 provides a summary of vessels participating in the Gulf reef fish fishery and their landings Section 3.4.4 and 3.5.4 provide a summary of the number of commercial and recreational HMS permit holders as well as shark limited access permit holders and their revenue.

Table 4.8.3 Total number of unique vessels recorded within each area from 2004-2015 (see Section 1.1 for data caveats) via electronic logbooks (ELB) and vessel monitoring systems (VMS). Except where indicated, new fishing regulations mean a proposed prohibition of fishing with bottom-tending gear defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels; and where buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2).

	ELB	VMS	New Fishing Regulations
Pulley Ridge Alt 1	0	65	No
Pulley Ridge Alt 2	8	103	Yes
Pulley Ridge Alt 3	1	77	Yes
Pulley Ridge Alt 4	1	69	Yes[1]
Long Mound	0	4	Yes
Many Mounds	0	9	Yes
North Reed Site	0	4	Yes
West Florida Wall	0	6	Yes
Alabama Alps	6	43	Yes
L&W Pinnacles and Scamp Reef	1	82	Yes
Mississippi Canyon 118	6	8	Yes
Roughtongue Reef	2	79	Yes
Viosca Knoll 826	3	9	Yes
Viosca Knoll 862/906	13	23	Yes[2]
AT 047	2	2	Yes
AT 357	1	2	Yes
Green Canyon 852	1	0	Yes
Harte Bank	4	8	Yes
Southern Bank	2	1	Yes
South Reed Site	0	3	Yes
Garden Bank 299	1	2	No
Garden Bank 535	0	0	No
Green Canyon 140 and 272	2	15	No
Green Canyon 234	3	2	No
Green Canyon 354	0	0	No
Mississippi Canyon 751	2	2	No
Mississippi Canyon 885	2	4	No

1. Fishing with a bottom trawl, buoy gear*, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round in the area of the HAPC (bottom longline is allowed).
2. Prohibit fishing with bottom-tending gear in the Viosca Knoll 862/906 HAPC is defined as: bottom longline, bottom trawl, buoy gear*, dredge, pot or trap, and bottom anchoring by fishing vessels. Provide an exemption to the bottom-tending gear for fishermen possessing a royal red shrimp endorsement and is fishing with royal red shrimp fishing gear.

Some fishing communities have been impacted by fishery management measures specific to their fishery. For instance, longline fishermen in the eastern Gulf were previously impacted by the establishment of Pulley Ridge and the area that prohibited bottom-tending gear. Longline fishermen were also impacted by Amendment 31 to the Reef Fish FMP which resulted in a June through August seasonal area closure for bottom long line reef fish fishermen in the eastern Gulf. The shrimping community has been impacted through changes to their gear type as well as area closures. However, as shown in Appendix D, very few of the areas to be designated have a substantial amount of fishing activity, now or in the past. Those that have been identified to have a substantial amount of fishing, or fishermen impacted (such as the proposed expansion of Pulley Ridge and the establishment of an HAPC at Viosca Knoll 862/906) currently have preferred alternatives to allow for those fishers to still participate much in the same way that they currently are. Regardless of some impacts to some fishing communities, it is not substantial and the actions in this amendment are not likely to have a cumulative negative impact in regards to regulatory threshold.

e. Administrative Environment

Thresholds will not be exceeded because of the contribution of establishing HAPCs with or without fishing regulations, with other cumulative activities affecting the administrative environment. Some stressors to the administrative environment are associated with the proposed actions. As discussed in Section 5.b.iv of this CEA, the stresses to the administrative environment include those from the development and implementation of fishery management plans, reviewing and permitting activities unrelated to fisheries, and responding to natural or manmade disasters.

These designations will not have any cumulative negative or beneficial impacts to marine transportation from an administrative perspective since there are no additional permits or designations needed, and transiting these areas is not prohibited.

As mentioned in Section 5.b.iv, these actions would not add additional administrative stress to oil, gas, mineral mining, or renewable energy installations. The BOEM is responsible for regulations that govern energy development operations on the Outer Continental Shelf through a regulatory mechanism called Notices to Lessees (NTL). The NTL 2009-G40[34], titled Deep-water Benthic Communities, increased the distance of avoidance from sensitive deep-water benthic communities, including deep coral habitats, for drilling discharges 333 fathoms (1998 ft) and anchoring 82 fathoms (492 ft). The NTL 2009-G40 applies to all oil and gas activities, including exploration and production drilling plans, as well as pipeline applications, in water deeper than 164 fathoms (984 ft). The NTL 2009-G39[35], titled Biologically-Sensitive Underwater Features and Areas, applies to water depths shallower than 164 fathoms (984 ft) and defined a new category of bottom features of moderate to high relief (about 6 ft) that are not protected by other biological lease stipulations, as potentially sensitive biological features. This includes the areas of Bright Bank, Geyer Bank and Sonnier Bank.

As mentioned in Section 5.b.iv, the actions in the amendment would not add additional administrative stress to oil, gas, mineral mining, or renewable energy installations, or any other construction activities. The proposed HAPCs are already designated as EFH, and as such, the Magnuson-Stevens Act requires federal agencies to consult with NMFS when their actions may adversely impact EFH. Adverse effect means any impact that reduces quality and/or quantity of EFH. Adverse effects as defined by the Magnuson-Stevens Act may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to,

[34] https://www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G40.aspx
[35] https://www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G39.aspx

benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (§600.810.a).

Pursuant to section 305(b)(2) of the Magnuson-Stevens Act, consultation with NMFS is already required for federal agencies regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect EFH. For example, if a project requires a federal permit, then the federal agency issuing the permit must consult with NMFS. EFH consultation is not required for actions that were completed prior to the approval of EFH designations by the Secretary of Commerce (Secretary), e.g., issued permits. Consultation is currently required for renewals, reviews, or substantial revisions of actions if the renewal, review, or revision may adversely affect EFH. Consultation on federal programs delegated to non-federal entities is currently required at the time of delegation, review, and renewal of the delegation. EFH consultation is currently required for any federal funding of actions that may adversely affect EFH. NMFS and federal agencies responsible for funding actions that may adversely affect EFH should consult on a programmatic level. Consultation is currently required for emergency federal actions that may adversely affect EFH, such as hazardous material clean-up, response to natural disasters, or actions to protect public safety (§600.920.a).

Under section 305(b)(4)(A) of the Magnuson-Stevens Act, NMFS is already required to provide EFH conservation recommendations to federal and state agencies for actions that would adversely affect EFH. NMFS will not recommend that state or federal agencies take actions beyond their statutory authority (§600.925.b).

Private landowners have no responsibilities to consult with NMFS directly. Consultation is required only if the project is funded, permitted, or authorized by a federal agency and the project may adversely affect EFH. In that case, the appropriate federal action agency is already required to consult with NMFS on behalf of the landowner.

Consultation and review is required for actions impacting areas with corals that are listed as part of the coral-FMU; therefore, the areas proposed in this amendment would have already required consultation, and will not cause additional administrative stress. Having these areas designated may assist developers in citing future projects and their legal obligations, as they are currently required to avoid and minimize impacts. Having these areas identified prior to project planning may assist developers in more efficiently and effectively directing financial and planning resources when scoping projects.

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed actions is to establish a point of reference for evaluating the extent and significance of expected cumulative effects.

a. Deep-water Corals and Coral Reefs

As discussed in Section 3.1.1 and 3.3.1, black corals and stony corals are managed under the Coral FMP. Black coral and stony coral harvest is prohibited in the EEZ of the Gulf. As discussed in Section 3.3, the Gulf contains both coral reef communities and solitary coral colonies. These exist from nearshore environments to continental slopes and canyons, including intermediate shelf zones. The geological complexity of the Gulf supports a high diversity of deep corals, each adapted to different environmental conditions. Corals may dominate a habitat, be a significant component, or be individuals within a community characterized by other fauna (Boland et al. 2016). Geologically and ecologically, the range of coral assemblages and habitat types in the Gulf are very diverse. Hard bottoms and hard banks, found on a wider bathymetric and geographic scale, often possess high species diversity, but may lack hermatypic corals, the supporting coralline structure, or some of the associated biota. In deeper waters, large elongate mounds called deep-water banks, hundreds of feet in length, often support a rich ecosystem compared with adjacent areas. Sea pens, cup corals and bamboo corals can occur in soft sediments, occasionally in high abundance over a large area. However, the highest diversity of large structure-forming coral tends to occur on hard bottom. In the mesophotic zone, 98 – 492 ft (16 - 82 fathoms), some of the limited hard substrate is of biogenic origin. Many other areas on the continental shelf are influenced by movement of underlying salt deposits that can raise the seabed to form banks or mounds where, in some cases, such as the Flower Garden Banks, mesophotic and shallower water corals exist. In one location, basalt spires form a volcanic chimney that is exposed at Alderdice Bank. Hard-bottom habitats below 656 - 984 ft (109-164 fathoms) are primarily the result of salt diapirs trapping hydrocarbons. Communities including solitary corals often lack topographic relief, but may use a sandy bottom instead. Solitary corals are a minor component of the bottom communities and comprise a minor percentage of the total coral stocks in the Gulf.

Research on deep corals in the Gulf has intensified substantially over the last decade. Since 2007, at least 52 research cruises have taken place in this region, greatly expanding the number of known deep coral habitats and increasing information about their distribution and community structure, as well as dispersal, growth and reproduction of key species (Boland et al. 2016). The branching stony coral *Lophelia pertusa* grows at a rate of .4 - .8 inches per year, while black corals of the genus *Leiopathes* have been aged at 2,100 years (Larcom et al. 2014, Proutey et al. 2016). However information on species density and richness is lacking in many areas, as well as more information on life history.

b. Ecosystem

As discussed in Section 5.b.ii of this CEA, the most diverse deep-water coral reef ecosystem known, occurs in the Southeastern U.S. and Gulf (Hourigan et al. 2017). Habitats formed by, and associated with, corals and sponges have been identified as priorities for deep-sea conservation in the U.S. (NOAA 2010) and internationally (Convention on Biological Diversity 2008; Food and Agriculture Organization 2009). The ecosystem is comprised of the deep-water corals, sponges, and other species they support. The corals provide habitat, vertical relief and structure, and food across the ocean floor for other species in the ecosystem.

A baseline for analysis of the physical environment, as discussed in Section 3.2, was conducted in the EIS EFH Amendment (GMFMC 2004). The physical environments in the different regions of the Gulf are summarized in Section 3.2. Fisheries that are part of the ecosystem include those in the Reef Fish FMP (Table 4.8.4), Spiny Lobster FMP, and Shrimp FMP.

The only true deep-water stony coral reefs observed in the continental United States occur in the southeast and Gulf. Deep-sea habitats are difficult and expensive to survey. The United States has the world's second largest EEZ, most of it below the edge of the continental shelf (i.e., greater than approximately 200 m deep). This area remains largely unmapped, and the areas visually surveyed for deep-sea corals or sponges are miniscule. Thus understanding the status of these ecosystems is also limited; more is known about the threats as discussed in 5.b.ii of this CEA than of the how these systems function.

c. Fish and Shrimp Fishery

i. Shrimp Fishery

As discussed in Section 3.1.2, the three species of penaeid shrimp (brown, white, and pink) managed by the Council are short lived and provide annual crops; royal red shrimp live longer, and several year classes may occur on the fishing grounds at one time. The condition of each penaeid shrimp stock is monitored annually, and none has been overfished for more than 40 years.

Cooperative management of penaeid shrimp species includes: simultaneous closure in both state and federal waters off the coast of Texas, the Tortugas Shrimp Sanctuary, and seasonally closed zones for the shrimp off the coast of Florida. The royal red shrimp fishery is only prosecuted in deeper waters of the EEZ. An endorsement to the federal commercial shrimp moratorium permit is required for vessels engaging in royal red shrimp fishing.

Brown, white, and pink shrimp use a variety of habitats as they grow from planktonic larvae to spawning adults (GMFMC 1981). Adult brown shrimp occur in marine waters extending from mean low tide to the edge of the continental shelf and are associated with silt, muddy sand, and sandy substrates. Adult white shrimp are demersal and inhabit nearshore Gulf waters to depths of 16 fathoms (96 feet) on soft bottoms. Pink shrimp juveniles inhabit almost every U.S. estuary in the Gulf. Juveniles are commonly found in estuarine areas. Adults inhabit offshore marine waters, with the highest concentrations in depths of 30 to 150 feet (5 to 25 fathoms).

Royal red shrimp are primarily fished over sand, mud, or silt bottom types. The fishery is prosecuted in areas and in depths where deep-sea corals may occur, and deep-sea corals are vulnerable to fishing gear. However, it is unlikely that many trawls will occur over deep-sea coral mounds. To do so would likely result in the loss of gear, so royal red shrimp fishermen avoid these areas. Deep-sea corals occur in the Gulf (Hourigan et al 2007) and the bottom habitat and bathymetric range of each deep-sea coral species is species-specific. Some pennatulids (sea pens) and other sea fans may occur on the soft bottoms along with royal red shrimp and are possibly removed by shrimp trawls. These organisms may also not be accounted for in bycatch estimates for several reasons, such as observers may be unaware, or because the sea pens and sea fans break up into pieces during the trawl and are not recovered in the net.

ii. Reef Fish Fishery

As discussed in Section 3.1.3, the commercial reef fish sector is managed through, but not limited to, annual catch limits (ACL), annual catch targets (ACT), accountability measures (AM), size limits, trip limits, individual fishing quota (IFQ) programs, seasonal closures, time and area/gear restrictions, and gear requirements. The recreational sector is managed through, but not limited to, ACLs, ACTs, AMs, size limits, bag limits, seasonal closures, time and area/gear restrictions, and gear requirements. The stock status for species in the Reef Fish FMP are listed in Table 4.8.4. For those species that have had a stock assessment and accepted status determination criteria, only greater amberjack is currently considered overfished, and greater amberjack and gray triggerfish are considered to be subject to overfishing, with rebuilding plans in place.

Table 4.8.4. Species of the Reef Fish FMP grouped by family, their stock status, and most recent stock assessment.

Common Name	Scientific Name	Stock Status		Most recent assessment or SSC workshop
		Overfishing	Overfished	
Family Balistidae – Triggerfishes				
gray triggerfish	*Balistes capriscus*	Y	N	SEDAR 43 2015
Family Carangidae – Jacks				
greater amberjack	*Seriola dumerili*	Y	Y	SEDAR 33 Update 2016a
lesser amberjack	*Seriola fasciata*	N	Unknown	SEDAR 49 2016
almaco jack	*Seriola rivoliana*	N	Unknown	SEDAR 49 2016
banded rudderfish	*Seriola zonata*	Unknown	Unknown	
Family Labridae – Wrasses				
Hogfish*	*Lachnolaimus maximus*	N	N	SEDAR 37 2013
Family Malacanthidae – Tilefishes				
tilefish (golden)	*Lopholatilus chamaeleonticeps*	N	N	SEDAR 22 2011a
blueline tilefish	*Caulolatilus microps*	Unknown	Unknown	
goldface tilefish	*Caulolatilus chrysops*	Unknown	Unknown	
Family Serranidae – Groupers‡				
gag	*Mycteroperca microlepis*	N	N	SEDAR 33 Update 2016b
red grouper	*Epinephelus morio*	N	N	SEDAR 42 2015
scamp	*Mycteroperca phenax*	Unknown	Unknown	
black grouper	*Mycteroperca bonaci*	N	N	SEDAR 19 2010
yellowedge grouper	*Hyporthodus flavolimbatus*	N	N	SEDAR 22 2011b
snowy grouper	*Hyporthodus niveatus*	N	Unknown	SEDAR 49 2016
speckled hind	*Epinephelus drummondhayi*	N	Unknown	SEDAR 49 2016
yellowmouth grouper	*Mycteroperca interstitialis*	N	Unknown	SEDAR 49 2016
yellowfin grouper	*Mycteroperca venenosa*	Unknown	Unknown	
warsaw grouper	*Hyporthodus nigritus*	N	Unknown	
Atlantic goliath grouper†	*Epinephelus itajara*	N	Unknown	SEDAR 47 2016
Family Lutjanidae – Snappers				
queen snapper	*Etelis oculatus*	N	Unknown	
mutton snapper	*Lutjanus analis*	N	N	SEDAR 15A Update 2015
blackfin snapper	*Lutjanus buccanella*	N	Unknown	
red snapper	*Lutjanus campechanus*	N	N	SEDAR 31 Update 2015
cubera snapper	*Lutjanus cyanopterus*	N	Unknown	
gray snapper	*Lutjanus griseus*	N	Unknown	
lane snapper	*Lutjanus synagris*	N	Unknown	SEDAR 49 2016
silk snapper	*Lutjanus vivanus*	Unknown	Unknown	
yellowtail snapper	*Ocyurus chrysurus*	N	N	SEDAR 27A 2012
vermilion snapper	*Rhomboplites aurorubens*	N	N	SEDAR 45 2016
wenchman	*Pristipomoides aquilonaris*	N	N	SEDAR 49 2016

Notes: Copies of the stock assessment final reports can be found at the Southeast Data, Assessment, and Review (SEDAR) web site.[36]
* The East Florida/Florida Keys hogfish stock is considered overfished and undergoing overfishing.
‡ In 2013 the genus for yellowedge grouper, snowy grouper, and warsaw grouper was changed by the American Fisheries Society from *Epinephelus* to *Hyporthodus* (American Fisheries Society 2013).
† Atlantic goliath grouper is a protected grouper (i.e., ACL is set at zero) and benchmarks do not reflect appropriate stock dynamics. In 2013 the common name was changed from goliath grouper to Atlantic goliath grouper to differentiate from the Pacific goliath grouper (American Fisheries Society 2013).

[36] http://sedarweb.org/

Saltwater anglers in the Gulf region caught approximately 140.7 million finfish in 2014. Approximately 10% of those fish were caught in the EEZ. The top four species groups by number of fish caught in all areas were herrings (34.9 million), drums (24.1 million), porgies (15.5 million), and jacks (11.9 million). Snappers ranked sixth (9.4 million). In the EEZ, the top five species groups by number of fish caught were snappers, sea basses, grunts, jacks, and herrings. Forty percent of snappers and 43% of sea basses that were caught by anglers in the Gulf in 2014 were caught in federal waters.

iii. Highly Migratory Species Fishery

As discussed in Section 3.1.4, the HMS commercial and recreational fisheries, including commercial shark fisheries, are managed by NMFS' Atlantic HMS Management Division within the Office of Sustainable Fisheries under the 2006 Consolidated Atlantic HMS Fishery Management Plan based upon their need for conservation and management. There are 53 HMS species, 23 of which are shark species, that legally may be harvested in commercial and recreational fisheries (Table 3.1.4.1). These species groups are subject to management measures such as permitting and reporting requirements, commercial quotas, gear regulations, closed areas, closed seasons, observer coverage, and vessel monitoring requirements. All of these species groups have established ACLs and AMs. The stock assessment information and the current stock statuses of Atlantic sharks under the domestic and, when applicable, international thresholds can be found in the 2017 SAFE[37] report and SEDAR 54[38].

[37] https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly
[38] http://sedarweb.org/sedar-54

d. Fish and Shrimp Fishing Communities

i. Reef Fish Fishing Communities

As discussed in Sections 3.4.3 and 3.5.3, the primary fishing communities whose activities would be affected by actions in this amendment and whose stocks interact most closely with coral habitats, are those with community members fishing for reef fish. The reef fish fishery is composed of a commercial and recreational sector, where recreational includes private anglers, charter boats, and headboats. The red snapper fishery recreational sector is divided into two components, the for-hire which includes charter boats and headboats, and private anglers.

As of August 23, 2017, there were 842 federally-permitted commercial Gulf reef fish vessels (SERO permit office). Gulf reef fish permits are issued to individuals in Florida (approximately 79% of Gulf reef fish vessels), Texas (9%), Louisiana (4.6%), Alabama (4.3%), and Mississippi (less than 1%, SERO permit office, August 23, 2017). Residents of other states (California, Georgia, Maine, North Carolina, New Jersey, New York, Ohio, Oregon, South Carolina, and Wisconsin also hold commercial reef fish permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf reef fish permits are held by individuals with mailing addresses in 220 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida and Texas (Table 3.5.3.1).

A valid Gulf reef fish permit is required to hold a commercial eastern Gulf reef fish bottom longline endorsement. As of August 23, 2017, there were 62 federally-endorsed commercial eastern Gulf reef fish bottom longline vessels (SERO permit office). Nearly all eastern Gulf reef fish bottom longline endorsements are issued to individuals in Florida, with one endorsement issued to an individual in Texas. Longline endorsements are held by individuals with mailing addresses in 25 communities and a large portion of these communities are located in the greater Tampa Bay area in Pinellas County and Manatee County (SERO permit office, August 23, 2017).

As of August 23, 2017, there were 1,279 federally-permitted charter/headboat for reef fish vessels (SERO permit office). Charter/headboat reef fish permits are held by individuals with mailing addresses in 349 communities (SERO permit office, August 23, 2017). Communities with the most commercial reef fish permits are located in Florida, Texas, Alabama, and Louisiana (Table 3.5.3.2). The communities with the most reef fish permits are Destin, Florida (5% of charter/headboat permits), Orange Beach, Alabama (3.8%), and Panama City, Florida (approximately 3.8%).

ii. Shrimping Communities

As discussed in Sections 3.5.2 and 4.5.2 vessels must possess a federal Gulf shrimp permit (SPGM) when fishing for penaeid shrimp in federal waters of the Gulf. In addition, a royal red shrimp endorsement is required for harvesting royal red shrimp in the Gulf EEZ and requires an SPGM. As of August 23, 2017, there were 1,429 federally-permitted Gulf shrimp vessels (SERO permit office). Gulf shrimp permits are issued to individuals in Texas (approximately 38%), Louisiana (approximately 27%), Florida (14%), Alabama (7.4%), and Mississippi (approximately 7%) (SERO permit office, August 23, 2017). Residents of other states (Alaska, California, Georgia, Hawaii, Massachusetts, Michigan, Minnesota, North Carolina, New Jersey, New Mexico, New York, Oklahoma, South Carolina, Tennessee, and Virginia) also hold commercial shrimp permits, but these states represent a smaller percentage of the total number of issued permits.

Gulf shrimp permits are held by individuals with mailing addresses 245 communities (SERO permit office, August 23, 2017). Communities with the most commercial shrimp permits are located in all Gulf states (Table 3.5.2.1). The communities with the most shrimp permits are Brownsville, Texas (5.9%), Port Isabel, Texas (5.1%), and Palacios, Texas (4.8%). The top shrimp communities ranked by pounds of commercial landings are dominated by Texas and Louisiana communities. However, Bayou La Batre, Alabama, ranks first in terms of pounds of overall shrimp landings (brown, white, pink, royal red, rock, and seabob, Figure 3.5.2.1).

Gulf royal red shrimp are landed primarily in Alabama and Florida. As of August 23, 2017, there were 291 federally-endorsed Gulf royal red shrimp vessels (SERO permit office). Gulf royal red shrimp endorsements are issued to individuals in Texas (36%), Florida (16%), Alabama (14%), Louisiana (13.8%), North Carolina (approximately 9%), and Mississippi (approximately 5%) (SERO permit office, August 23, 2017). Residents of other states (California, Georgia, Massachusetts, New Jersey, and Virginia) also hold royal red shrimp endorsements, but these states represent a smaller percentage of the total number of issued permits. Communities with the most royal red shrimp endorsements are located in all Gulf states, as well as North Carolina and Virginia (Table 3.5.2.1). The communities with the most royal red shrimp endorsements are Brownsville, Texas (15.1% of royal red shrimp endorsements), Port Isabel, Texas (11.7%), and Bayou La Batre, Alabama (5.5%).

iii. Highly Migratory Species Fishing Communities

As discussed in Section 3.5.4, in 2017, there were 257 federally-permitted directed or incidental swordfish vessels, 83 handgear swordfish vessels, and 613 general commercial swordfish vessels (NMFS 2017). A large proportion of swordfish permits (41.2% of directed or incidental permits, 37.3% of handgear permits, and 85.4% of general commercial swordfish permits) are issued to individuals who reside outside of Gulf states. In 2017, there were 280 federally-permitted tunas longline vessels and 2,940 federally-permitted tunas general category vessels (NMFS 2017). A large proportion of the tunas longline permits (41.4%) and the majority (91.9%) of tunas general category permits are issued to individuals who reside outside of Gulf states.

Shark Fishery Communities

As discussed in Section 3.5.4., as of October, 2017, there were 490 federally-permitted commercial shark vessels (SERO permit office). Based on analysis of the shark limited access permit holders and their 2017 landings data (SERO Permit Office), there are a total of 304 commercial shark permit holders with a shark directed or incidental limited access permit that have at least one or more Gulf fishing permits. Of these permit holders, 105 have either a directed or incidental limited access permit and either a Gulf reef fish and/or shrimp fishing permit. However, only 11 out of the 105 permit holders have active shark fishing vessels in the Gulf of Mexico (active being defined as directed shark permit holders with valid permits that landed one shark per year based on 2018 HMS electronic dealer reports). In addition, approximately, 231 permit holders have a valid shark directed or incidental limited access permit, but do not hold any of the Gulf fishing permits mentioned above. However, only 7 of the 231 permit holders have active shark fishing vessels in the Gulf.

e. Administrative Environment

NMFS is responsible for conserving and managing marine fishery resources in federal waters of the Gulf from the Florida Keys through Texas. The Magnuson-Stevens Act authorizes NMFS to manage the nation's fisheries based on the best available science. NMFS works with the Council which is made up of state directors, federal fishery managers, scientists, and fishing industry representatives appointed by each state's Governor. Council members identify how a fishery should be managed, develop an FMP or amendment, and recommend regulatory actions to NMFS, if needed. NMFS is also responsible for managing permitting of vessels in the Gulf, administering catch share programs, and collecting and monitoring landings data.

The NMFS Office of Law Enforcement is responsible for enforcing domestic laws, including the Magnuson-Stevens Act in the federal waters of the Gulf as well as international treaty requirements.

The BOEM offshore leasing and operations are governed by a wide variety of laws, regulations, and other communications with the offshore industry. BOEM enforces compliance with these regulations and periodically updates rules. Regulations affecting BOEM are contained in the code of federal regulations Title 30, Chapter V (500-599).[39] BOEM manages the responsible development of oil and gas and mineral resources in seven planning areas on the offshore continental shelf of the Gulf and Atlantic region. The Gulf's Central and Western Planning areas are offshore Texas, Louisiana, Mississippi, and Alabama. Regional offices oversee lease management, exploration and development plans, geological and geophysical analysis and permitting, environmental analysis, assessment and studies, resource evaluation and coastal restoration projects.

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

Cause-and–effect relationships are presented in Tables 4.8.5.

[39] https://www.ecfr.gov/cgi-bin/text-idx?SID=8d94ab584c6867c64f6e9ffe754585f7&mc=true&tpl=/ecfrbrowse/Title30/30cfrv2_02.tpl#500

Table 4.8.5. The cause and effect relationship and regulatory actions for deep-water corals and coral reefs within the time period of the CEA.

Time period	Cause	Observed and/or expected effects
1984-2020	Climate Change	Changes in ocean acidity and temperature modifies corals ability to construct their skeletons and may impact spawning and recruitment. Warming oceans and rising seas are expected to shift fish distributions and impact life history.
1984	Need to protect EFH particularly sensitive to human-induced impacts and prohibit the taking or destruction of stony corals and sea fans (*Gorgonia flabellum* and *Gorgonia ventalina*)	Established unique HAPC for coral; and prohibited the taking or destruction of stony corals and sea fans except under scientific and educational permits through the original Coral FMP
1990	The Coral FMP management unit needed to be defined	The Coral FMP management unit was established as consisting of coral reefs, stony corals, and octocorals; stony corals included species belonging to Class Hydrozoa (fire corals and other hydrocorals) and Class Anthozoa, Subclass Zoantharia (stony corals and black corals); and octocorals included in Class Anthozoa, Subclass Octocorallia; defined coral reefs as including hard bottom, deep-water banks, patch reefs, and other outer bank reefs through Amendment 1 to the Coral FMP
1998	EFH needed to be described based on known distributions of corals specified in the Coral FMP	EFH was described and threats and research needs of EFH were identified through the Generic EFH Amendment.
1998	Implement protections on sensitive biological habitats in the central and western Gulf to reduce impacts to coral reefs from smothering effects from drilling and production effluent, and mechanical damage from rig, platform, and anchor placement	Notice to Lessees and Operators of Federal Oil, Gas, and Sulphur Leases in the Outer Continental Shelf, Gulf of Mexico OCS region NTL No. 98-12[40] was implemented to protect benthic habitat
1999	Provide scientific definitions for Coral FMP stocks.	The Coral FMP stock was defined and the optimum yield was set to zero for all stony and black coral species through the Generic Sustainable Fisheries Act Amendment
1999	Develop a live bottom stipulation to ensure that impacts from oil and gas activities in the northeast central and eastern Gulf were minimized by requiring lessees to survey the area for live bottom.	The Notice To Lessees and Operators of Federal Oil, Gas, and Sulphur Leases and Pipeline Right-Of-Way Holders Outer Continental Shelf, Gulf Of Mexico Region NTL No. 99-G016[41] was implemented with a live bottom stipulation for oil and gas activities

[40] https://www.bsee.gov/sites/bsee.gov/files/notices-to-lessees-ntl/expired-ntls/ntl98-12.pdf
[41] https://www.bsee.gov/sites/bsee.gov/files/notices-to-lessees-ntl//ntl99-g16.pdf

Time period	Cause	Observed and/or expected effects
2001	Reduce impacts to EFH and protect areas with significant marine resources from fishing in the vicinity of the Dry Tortugas.	Established the Tortugas Marine Reserves through the Generic Amendment Addressing the Establishment of the Tortugas Marine Reserves to provide protections for benthic habitats
2004	Consolidate guidance for the avoidance and protection of biologically sensitive features and areas (i.e., topographic features, pinnacles, live bottoms (low-relief features), and other potentially sensitive biological features when conducting operations in water depths less than 219 fathoms (1,312 feet) in the Gulf.	The Notice To Lessees and Operators of Federal Oil, Gas, and Sulphur Leases and Pipeline Right-Of-Way Holders Outer Continental Shelf, Gulf Of Mexico Region NTL No. 2004-G05[42] was implemented
2005	Reduce impacts to EFH and protect commercially important fish habitat.	Established Pulley Ridge HAPC, Stetson Bank HAPC, and McGrail Bank HAPC, and prohibited fishing with a bottom longline, bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels in those areas through Generic Amendment 3 to the Coral FMP
2009	Provide and consolidate guidance on avoiding biologically sensitive areas in water depths 984 ft (164 fathoms) or greater, needed to broaden the scope of the guidance to cover all high-density deep-water benthic communities, change the definition of deep-water from 1,312 ft (219 fathoms) to 984 ft (164 fathoms), increase the separation distance from muds and cuttings discharge locations from 1,500 ft to 2,000 ft, and provide for an additional 1,000-ft buffer area beyond maximum anchor areas.	The Notice To Lessees and Operators of Federal Oil, Gas, and Sulphur Leases and Pipeline Right-Of-Way Holders Outer Continental Shelf, Gulf Of Mexico Region NTL 2009-40[43] was implemented to provide protections for benthic habitat
2009	Consolidate guidance for the avoidance and protection of biologically sensitive features and areas (i.e., topographic features, pinnacles, low relief features, and other potentially sensitive biological features) when conducting oil, gas, and mineral operations in water depths less than 164 fathoms (984 feet) in the Gulf. Needed to change the water depth applicability of the NTL from 1,312 ft (219 fathoms) to 984 ft (164 fathoms)	The Notice To Lessees and Operators of Federal Oil, Gas, and Sulphur Leases and Pipeline Right-Of-Way Holders Outer Continental Shelf, Gulf Of Mexico Region NTL No. 2009-G39[44] was implemented to provide protections for benthic habitats

[42] https://www.bsee.gov/sites/bsee.gov/files/notices-to-lessees-ntl/expired-ntls/ntl2004-g05.pdf
[43] https://www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G40.aspx
[44] https://www.boem.gov/Regulations/Notices-To-Lessees/2009/09-G39.aspx

Time period	Cause	Observed and/or expected effects
2010	Reduce impacts to EFH from bottom trawl gear	Required bottom trawl gear required to have a weak link through Generic Amendment 3
2010	Deep-water Horizon Oil Spill	Significant impacts to EFH and deep-water corals. Impacts range from immediate mortality to prolonged stress affecting growth, spawning, and recruitment of deep-water corals.
2011	Florida, the only state with known octocoral harvest, manages the octocoral harvest in state and federal waters	Octocorals were removed from the Coral FMP through the Generic ACL/AM Amendment
2019	New available scientific information identified additional areas of substantial benthic resources that warranted designation as HAPCs in the Gulf of Mexico.	Amendment 9 to the Coral FMP
2020	The Council reviews additional potential areas for consideration as HAPCs in the Gulf that were identified through the same process leading to Amendment 9 to the Coral FMP	Amendment 10 to the Coral FMP
Timeline uncertain	New available scientific information identified additional areas of substantial benthic resources in the vicinity of Flower Garden Banks National Marine Sanctuary	Flower Garden Banks National Marine Sanctuary Expansion Amendment
Timeline uncertain	New available scientific information warranted a review of the current FKNMS	FKNMS continues to review changes to current boundaries and regulations

9. Determine the magnitude and significance of cumulative effects

a. Corals and Coral Reefs

There are over 100 species of black and stony coral included in the Coral FMP and FMU. Table 4.8.6 provides the cumulative area within federal Gulf waters that have these species and will be impacted by these actions. Table 4.8.2 provides the cumulative areas within federal Gulf waters to be impacted by these actions as well as areas already designated as National Marine Sanctuaries, Marine Reserves, or HAPCs. The table provides information on whether or not fishing regulations would be implemented based on the Council's current preferred alternatives.

Table 4.8.6. Total area in nm^2 and as a percentage of federal waters of the Gulf of Mexico (as defined for the Reef Fish FMP) to be designated as HAPCs. Also includes comparison of areas to be designated with and without fishing regulations based on the Council's preferred alternatives.

Site Name	New Regulations[1]	area in nm^2	% of Gulf federal waters
Entire Federal waters of the Gulf (approximate)		182,752	
Pulley Ridge North (Alternative 2)	no	2302.4	1.260%
Pulley Ridge South Expansion (Alternative 3)	no	194.2	0.106%
Pulley Ridge South (Alternative 1)	no	100.7	0.055%
Pulley Ridge South Portion A (Preferred Alternative 4)	yes, with consideration for bottom longline fishermen[2]	93.6	0.051%
Green Canyon 140/272 (Preferred Alternative 5)	no	81.6	0.045%
West Florida Wall (Preferred Alternative 5)	no	36.3	0.020%
Viosca Knoll 862/906 (Preferred Alternative 7)	yes, with consideration for royal red shrimpers[3]	18.8	0.010%
L & W Pinnacles and Scamp Reef (Preferred Alternative 3)	yes	14.3	0.008%
Long Mound (Preferred Alternative 2)	yes	13.6	0.007%
North Reed (Preferred Alternative 4)	yes	13.6	0.007%
Roughtongue Reef (Preferred Alternative 5)	yes	13.6	0.007%
Green Canyon 234 (Preferred Alternative 6)	no	13.6	0.007%
Many Mounds (Preferred Alternative 3)	yes	13	0.007%
Mississippi Canyon 118 (Preferred Alternative 4)	yes	11	0.006%
Harte Bank (Preferred Alternative 2)	yes	10.8	0.006%
Viosca Knoll 826 (Preferred Alternative 6)	yes	10.3	0.006%
AT 047 (Preferred Alternative 2)	yes	6.8	0.004%
AT 357 (Preferred Alternative 3)	yes	6.8	0.004%
South Reed (Preferred Alternative 2)	no	6.8	0.004%
Garden Banks 535 (Preferred Alternative 4)	no	6.8	0.004%
Green Canyon 354 (Preferred Alternative 7)	no	6.8	0.004%
Mississippi Canyon 751 (Preferred Alternative 8)	no	6.8	0.004%
Mississippi Canyon 885 (Preferred Alternative 9)	no	6.8	0.004%
Garden Banks 299 (Preferred Alternative 3)	no	6.5	0.004%
Green Canyon 852 (Preferred Alternative 4)	yes	3.8	0.002%
Alabama Alps (Preferred Alternative 2)	yes	2.7	0.001%
Southern Bank (Preferred Alternative 3)	yes	0.8	0.000%
Total area within federal waters of the Gulf proposed to have new HAPCs with fishing regulations		**233.5**	**0.128%**
Total area within federal waters of the Gulf proposed to have new HAPCs without fishing regulations		**172**	**0.094%**
Total area within federal waters of the Gulf proposed as new HAPCs (does not include Pulley Ridge, which is already an HAPC)		**311.9**	**0.171%**

1. Except where indicated, proposed new fishing regulations include the following prohibitions for bottom-tending gear. Bottom-tending gear is defined as: bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels. Buoy gear is defined as in 50 CFR 622.2 and does not refer to HMS buoy gear (defined by 50 CFR 635.2) which is not a bottom-tending gear.
2. Fishing with a bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels are prohibited year-round.
3. Provide an exemption to the bottom-tending gear for fishermen possessing a royal red shrimp endorsement and is fishing with royal red shrimp fishing gear.

In general, fishing gear that can impact deep-water corals and coral reefs include: fish otter trawls, shrimp otter trawls, roller frame trawls, and pair trawls over coral reefs; crab traps; and dredges (GMFMC 2004). Some of these gear/habitat interactions are unlikely to occur in actual practice (e.g., shrimp trawls towed through hard bottom areas can destroy shrimp nets and so are avoided). Generally, gear that is actively fished by towing has the highest potential to alter habitats. However, deep-water corals and coral reefs are sensitive to interactions with passive gear (e.g. traps) as well. In the past, some fishing practices have had detrimental effects on the physical environment. Gear such as roller trawls and fish traps damage habitats while harvesting fish species. Protections have been developed, primarily by either prohibiting fishing or limiting fishing activities that can occur within certain areas. In addition, regulatory changes through Generic EFH Amendment 3 (GMFMC 2005; implemented in 2006) prohibited bottom anchoring and the use of trawling gear, bottom longlines, buoy gear, and all traps/pots to protect coral reefs in several HAPCs. It also required a weak link in the tickler chain of bottom trawls on all habitats throughout federal waters of the Gulf to minimize damage done to those habitats, should the chain get hung up on natural bottom structures. Various types of gear are used to capture shrimp, including but not limited to: cast nets, haul seines, stationary butterfly nets, wing nets, skimmer nets, traps, and beam trawls. The otter trawl, with various modifications, is the dominant gear used in offshore waters, and there has been a decline in the number of otter trawls in recent years (NMFS 2014). Details about the specifics of each gear type as well as the historical development of the fishery can be found in Shrimp Amendments 13 and 14 (GMFMC 2007). Participation in the royal red shrimp component of the fishery requires more cable than that used for shallow-water penaeid shrimp. Although the industry continuously works to develop more efficient gear designs and fishing methods, the quad rig is still the primary gear used in federal waters.

Current allowable gear types can adversely affect deep-water coral and coral reefs and the actions in this amendment would be beneficial (See Section 4.1.1). Handline gear and longlines used in the reef fish fishery can damage habitat through snagging or entanglement. Longlines can also damage hard bottom structures during retrieval as the line sweeps across the seafloor, breaking corals or removing them from the substrate. Additionally, anchoring over hard-bottom areas can also affect corals by breaking or causing mortality of a colony, as well as impacting the habitat the corals need to grow. However, these gear types are not believed to have much negative impact on bottom structures and are considerably less destructive than other commercial gear, such as traps and trawls, which are not allowed for reef fish fishing. Shrimping gear can directly impact corals by breaking them or separating them from the bottom, often times resulting in colony mortality.

Damage caused from reef fish fishing and shrimping, is associated with the level of direct effort in those sensitive habitats. Therefore, actions reducing levels of effort (prohibiting certain gear types) would result in greater benefits to the physical environment because fishing-related interactions with habitat would be reduced. Thus, actions described in this amendment which prohibit certain fishing gear can reduce the fishing effort in EFH areas and thus reduce impacts to corals and coral reefs in that area. The actions described in this amendment which designate an HAPC without fishing regulations, draw attention to EFH areas to allow some fisheries to avoid those areas, resulting in a positive effect on deep-water corals and coral reefs. RFFAs, such as Coral Amendment 10 and the FGBNMS Expansion DEIS should also benefit these habitats as they would reduce or limit fishing effort.

The actions in this amendment are not likely to change the hypoxic zone, reduce non-fishing related marine debris in these areas, or reduce impacts from oil, gas, mineral, or renewable energy installations or from other construction. Similarly the actions in this amendment are not likely to increase or change the impacts of climate change on deep-water corals (such as ocean acidification). However, preventing physical impacts from fishing gear would reduce additional stresses on the coral colony and ultimately be beneficial in light of these other cumulative effects. Also, designating HAPCs without fishing regulations may assist some industries (such as shipping, oil and gas, mining, etc.) in being aware of these sensitive habitats and better prevent unintentional impacts by avoiding or minimizing impacts from planned projects or industry related activities.

b. Ecosystem

The magnitude and significance of the cumulative affects to the ecosystem are similar to the affects to the coral and coral reefs as described in Section 9 a of this CEA. As shown in Table 4.8.6, currently 1.967% of federal Gulf waters are designated as a National Marine Sanctuary, Marine Reserve, or HAPC; the actions in this amendment will increase that by 0.171%, for a cumulative area of 2.137%. Additionally, currently 0.656% of federal Gulf waters have National Marine Sanctuary, Marine Reserve, or HAPC designation with fishing regulations and these actions will increase that by 0.128% for a cumulative area of 0.784%.

In general, fishing gear can impact deep-water ecosystems which include not only the corals but also other species such as sponges, octocorals, fish, and invertebrates. As mentioned in Section 9 a of this CEA, trawls, traps, and rakes can all impact the habitat by denuding it of organisms and rubbleizing the substrate. This can result in some organisms not being able to resettle the area, or a change in the diversity of benthic organisms, generally progressing to a more homogenous environment. Some of these gear/habitat interactions are unlikely to occur in actual practice (e.g., shrimp trawls towed through hard bottom areas can destroy shrimp nets and so are avoided).

Current allowable gear types can adversely affect deep-water ecosystems and the actions in this amendment would be beneficial (See Section 4.1.1). Handline gear and longlines used in the reef fish fishery can damage the ecosystem by snagging benthic organisms (sponges, octocorals, etc.) or becoming entangled on ledges. Longlines can also damage hard bottom structures during retrieval as the line sweeps across the seafloor. Additionally, anchoring over hard-bottom areas can also affect benthic habitat by breaking or destroying hard bottom structures. However, these gear types are not believed to have much negative impact on bottom structures and are considerably less destructive than other commercial gears, such as traps and trawls, which are not allowed for reef fish fishing. Shrimping gear can also adversely affect the ecosystem by reducing or eliminating the vertical relief provided by those organisms the gear is removing.

Damage caused from reef fish fishing and shrimping is associated with the level of direct effort in those sensitive habitats. Therefore, actions reducing levels of effort (prohibiting certain gear types) would result in greater benefits to the ecosystem because fishing related interactions with habitat would be reduced. Thus, actions described in this amendment which prohibit certain fishing gear can reduce the fishing effort in EFH areas and reduce impacts to the ecosystem in that area. The actions described in this amendment which designate an HAPC without fishing regulations, draw attention to EFH areas to allow some fisheries to avoid those areas, resulting in a positive effect on deep-water corals and coral reefs. RFFAs, such as Coral Amendment 10 and the FGBNMS Expansion DEIS should also benefit these habitats as they would also reduce or limit fishing effort.

The actions in this amendment are not likely to change the hypoxic zone, reduce non-fishing related marine debris in these areas or reduce impacts from oil, gas, mineral, or renewable energy installations or from other construction. Similarly the actions in this amendment are not likely to increase or change the impacts of climate change on deep-water corals (such as ocean acidification). However, preventing physical impacts from fishing gear would reduce additional stresses on the ecosystem and ultimately be beneficial in light of these other cumulative effects. Also, designating HAPCs without fishing regulations may assist some industries (such as shipping, and oil and gas mining etc.) in being aware of these sensitive habitats and better prevent unintentional impacts to them by avoiding or minimizing impacts from planned projects or industry related activities.

c. Reef Fish, Highly Migratory Species, and Shrimp Fisheries

There are 31 species of reef fish managed in the Reef Fish FMP, and of the species where the stock status is known, only greater amberjack is considered overfished, is undergoing overfishing, and is under a rebuilding plan. Gray triggerfish is considered subject to overfishing and is under a rebuilding plan. Red snapper is also under a rebuilding plan. There are currently three species of penaeid shrimp and royal red shrimp managed in the Shrimp FMP, none of which are overfished or undergoing overfishing. There are currently 53 species managed under the 2006 Consolidated Atlantic Highly Migratory Species Fisheries Management Plan.

In the past, the lack of management of deep-water coral and coral reefs allowed areas of EFH to be substantially impacted by fishing activities. These impacts negatively affected corals as well as the fisheries that depend on those coral areas. The actions in this amendment would only have beneficial effects on managed species in the Gulf through the protection of habitat and ecosystem components that are important to those species. This includes the benefits of preserving habitat important to fish and invertebrate species for foraging, shelter, and reproductive activities.

As mentioned above, the actions in this amendment are not likely to change or influence other natural or anthropogenic environmental effects currently occurring in the Gulf. However, preventing physical impacts from fishing gear and protecting the corals and coral reef ecosystem components that many fish species depend on ensures continued habitat and refugia exist for these species into the future. Also, designating HAPCs without fishing regulations may assist some industries (such as shipping, oil and gas, mining, etc.) in being aware of these sensitive habitats and better prevent unintentional impacts to them by avoiding or minimizing impacts from planned projects or industry related activities.

d. Reef Fish, Highly Migratory Species, and Shrimp Fishing Communities

Adverse or beneficial effects of actions on recreational or commercial fishing are tied to the ability of a vessel to successfully land fish. Recreational and commercial fisheries have benefited from past actions relative to this action. Protecting EFH allows for the continued spawning, recruitment, and protection of fishery species. Additionally, measures to protect EFH by designated HAPCs have the potential to enhance areas outside of those HAPCs through spillover effects as fish move out of those HAPCs into adjacent waters, habitats, or artificial reefs.

Negative effects from these actions would include prohibiting fishing that is currently occurring in areas that are designated as HAPCs with fishing regulations. As shown in Table 4.8.3 and Table 1.1.2., for those fisheries with location information, very few of the proposed areas had a substantial amount of fishing activity over the 11 years presented. In the case of Pulley Ridge and Viosca Knoll, additional measures within the actions would be implemented to reduce the impacts to bottom longline fishermen or the royal red shrimping fleet. In the proposed Pulley Ridge south area, the preferred alternative allows bottom longline fishing as the only bottom-tending gear fishing allowed. In the proposed Viosca Knoll 862/906 HAPC, the preferred alternative is to allow those shrimping vessels with a royal red shrimp endorsement to leave their nets in the water, with the intent of having those nets off the bottom so as not to impact the habitat, but to also allow fishermen to efficiently and safely shrimp the areas nearby.

The RFFAs such as Coral Amendment 10 and FGBNMS Expansion would have similar negative and beneficial effects as described above. However, the protection of deep-water corals and coral reefs should ultimately be a net benefit to the fishery, as it protects important benthic habitat.

Infrastructure refers to fishing-related businesses and includes marinas, rentals, snorkel and dive shops, boat dockage and repair facilities, tackle and bait shops, fish houses, and lodgings related to recreational fisheries industry. This infrastructure is tied to commercial and recreational fisheries and can be affected by adverse and beneficial economic conditions in those fisheries. Past actions protecting shallow water, mesophotic, and deep-water coral and coral areas have been beneficial by preserving EFH.

As mentioned above, the actions in this amendment are not likely to change or influence other natural or anthropogenic environmental effects currently occurring in the Gulf. However, preventing physical impacts from fishing gear and protecting the corals and coral reefs ecosystem components that many fish species depend on, ensures continued habitat and refugia exist for these species into the future, thereby supporting the Gulf ecosystem and its managed fisheries. Also, designating HAPCs without fishing regulations may assist some industries (such as shipping, oil and gas, mining, etc.) in being aware of these sensitive habitats and better preventing unintentional impacts by avoiding or minimizing impacts from planned projects or industry related activities.

e. Administrative Environment

Administration of fisheries is conducted through federal (including the Council) and state agencies which develop and enforce regulations, collect data on various fishing entities, and assess the health of various stocks. As more regulations are required to constrain stock exploitation to sustainable levels, greater administration of the resource is needed. Protecting corals and coral reefs in the Gulf helps protect other fishery stocks by maintaining habitat that may be important in their life cycle. The administrative burden of establishing HAPCs is short-term and not significant, but the long term benefits of protecting those areas may reduce the administrative burden of managing other fishery species.

Current reef fish and shrimp regulations are labor intensive for law enforcement officials. NMFS Office of Law Enforcement officials work cooperatively with other federal and state agencies to keep illegal activity to a minimum. The NMFS Office of Law Enforcement would continue to monitor regulatory compliance with existing regulations and NMFS would continue to assess the benthic habitats of the Gulf. These actions would not result in additional significant impact to those offices.

Establishing HAPCs with or without fishing regulations in the Gulf would not add any additional administrative burden to BOEM or other agencies and entities responsible for reviewing, permitting, or constructing oil, gas, or mineral mining, renewable energy, or other construction installations.

Establishing HAPCs with or without fishing regulations would result in the need for current nautical charts to be updated. The Office of Coast Survey within NOAA is responsible for providing navigation products and services, and would be responsible for updates as part of its standard responsibilities. These actions would not result in a significant impact to that office.

As mentioned above, the actions in this amendment would not change or influence other natural or anthropogenic environmental effects currently occurring in the Gulf. Therefore, the actions in this amendment would not change or influence the administrative burden of addressing those other cumulative issues.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects

As discussed in Section 1.1 of this amendment, many meetings were held with coral scientists, as well as members of the fishing communities potentially impacted by these actions. During that review process, the HAPCs themselves were modified in order to provide benefits to the resource while minimizing any significant cumulative effect to the fishing communities. The current preferred alternatives will benefit the corals and coral reefs, as well as fisheries of the Gulf, and will not significantly impact current fishing or shrimping communities. Very few of the areas being proposed currently have evidence of substantial fishing activity. For those areas that do have evidence of substantial fishing activity, alternatives have been developed to avoid or minimize the impact to those fishing communities.

Avoidance measures include the preferred alternative to allow bottom longline fishing to occur in areas of Pulley Ridge where it has historically occurred, and allowing the royal red shrimp fleet to leave their nets in the water in the Viosca Knoll 862/906 area, with their nets not in contact with coral.

Several HAPCs (Alabama Alps, L&W Pinnacles, Scamp Reef, and Roughtongue Reef) have options to prohibit fishing with bottom-tending fishing gear but allow anchoring. This would allow the bandit rig fishermen to continue to fish in the areas that they have been observed historically. However, the Council has not selected those options as the preferred.

Additionally, establishing areas as HAPCs without fishing regulations helps to avoid and minimize cumulative impacts to fishing communities and the administrative environment by implementing the appropriate level of management necessary based on the best information available.

11. Monitor the cumulative effects of the selected alternative and modify management as necessary.

The effects of the proposed actions are, and will continue to be, monitored through collection of benthic habitat assessments. Also, fishing and shrimping activity will continue to be monitored through VMS and ELB data.

4.9 Other Effects

4.9.1 Unavoidable Adverse Effects

Unavoidable adverse effects include preventing fishing and shrimping communities that use bottom-tending gear to fish in some of the designated areas where the gear is currently used. This is expected to have some short-term negative effects on the social and economic environment and will create some burdens with respect to the administrative environment. These effects are discussed in detail in Sections 2.1-2.7, and Section 4.1-4.7 Subsection 2, 3, and 4, respectively of this document. However, very few areas have a substantial amount of fishing activity. For some areas that do have shrimping and fishing activity, measures to avoid and minimize adverse effects are discussed in Section 4.8. Overall, short-term impacts of actions would be offset with the protection of these deep-water coral and coral reefs.

The actions considered in this amendment should not have an adverse effect on public health or safety because these measures should not alter actual fishing practices but where harvest can occur. Unique characteristics of the geographic area are highlighted in Chapter 3. Effects of fishing activities on the physical environment are described in this amendment. This section concludes that the impact on the physical environment should be beneficial from actions proposed in this document. Uncertainty and risk associated with the measures are described in detail in the same sections as well as assumptions underlying the analyses.

4.9.2 Relationship between Short-term Uses and Long-term Productivity

The primary objective of this amendment and associated EIS is to define and designate HAPCs in the Gulf. However, because few areas being designated currently have substantial fishing, the effects are likely to be minimal.

Some alternatives are being considered that would avoid short-term negative effects because they provide options to allow some types of fishing to continue to occur, or they do not establish additional fishing regulations. The range of alternatives has varying degrees of economic costs and administrative burdens. Some alternatives have relatively small short-term economic costs and administrative burdens, while other alternatives have greater short-term costs. Ultimately, the establishment of an HAPC should result in long-term positive benefits through continued production of corals and continued productivity of the deep-water ecosystem.

4.9.3 Mitigation, Monitoring, and Enforcement Measures

Implementation of the designation of HAPCs in the Gulf will have very few short-term negative effects. Mitigation of these effects has included allowing bottom longline fishing to occur in an area of Pulley Ridge where it has historically occurred, and to allow the royal red shrimp fleet to leave their nets in the water in the Viosca Knoll 862/906 HAPC. The majority of the other areas proposed in this amendment do not have substantial fishing activity. Ultimately, protecting these areas will have net beneficial effects.

Reef fish, HMS, and shrimp fishing management measures include a number of area-specific regulations where fishing is restricted or prohibited in order to protect habitat or spawning aggregations of fish, or to reduce fishing pressure in areas that are heavily fished. To improve enforceability of these areas, the Council has established a vessel monitoring system program for the commercial reef fish sector. VMS allows NMFS Office of Law Enforcement personnel to monitor compliance with these area-specific regulations, and track and prosecute violations.

Current reef fish, HMS, and shrimp regulations are labor intensive for law enforcement officials. NMFS law enforcement officials work cooperatively with other federal and state agencies to minimize illegal activity. For reef fish commercial and for-hire operators; HMS private recreational and for-hire recreational, and commercial; and commercial shrimping, permits that are required to operate in their respective fisheries can be sanctioned.

4.9.4 Irreversible and Irretrievable Commitments of

There are no irreversible or irretrievable commitments of agency resources proposed herein. The actions to establish HAPCs are readily changeable by the Council in the future. There may be some loss of immediate income to some sectors unable to fish historic areas with the gear previously used.

4.10 Any Other Disclosures

CEQ guidance on environmental consequences (40 CFR §1502.16) indicates the following elements should be considered for the scientific and analytic basis for comparisons of alternatives. These are:

a) Direct effects and their significance.
b) Indirect effects and their significance.
c) Possible conflicts between the proposed actions and the objectives of federal, regional, state, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned.
d) The environmental effects of alternatives including the proposed action.
e) Energy requirements and conservation potential of various alternatives and mitigation measures.
f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.
g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.
h) Means to mitigate adverse environmental impacts.

Items a, b, d, e, f, and h are addressed in Chapters 2, 3, and 4. Items a, b, and d are directly discussed in Chapters 2 and 4. Item e is discussed in the CEA, and no energy requirements will be affected. Item h is discussed in in this CEA.

The other elements are not applicable to the actions taken in this document. Because this amendment concerns the establishment of HAPCs in federal Gulf waters, and does not confer any additional consultation or permitting, it is not in conflict with the objectives of federal, regional, state, or local land use plans, policies, and controls (Item c). Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures (Item g) are not factors in this amendment. The actions taken in this amendment will affect deep-water corals and their habitat, and should not affect land-based, urban environments. The *U.S.S. Hatteras*, located in federal waters off Texas, is listed in the National Register of Historic Places, but the proposed actions would not interact with the historic site.

With regard to species in the Gulf protected under the Endangered Species Act (ESA), protected species include: marine mammal species (dolphins, sei, fin, humpback, sperm whales, and manatees); sea turtles (Kemp's ridley, loggerhead (North Atlantic distinct population segment (DPS)), green (North Atlantic and South Atlantic DPSs), leatherback, and hawksbill); fish species (Gulf sturgeon, smalltooth sawfish, Nassau grouper, oceanic whitetip shark, and giant manta ray); and coral species (elkhorn coral, lobed star coral, boulder star coral, and mountainous star coral). Also, the blue, sei, fin and north Atlantic right whales are ESA protected and have records in the Gulf, but are very uncommon to rare. Seven species of fish and invertebrates in the Gulf are currently listed as species of concern (see Section 3.3.3 for more information on ESA species).

CHAPTER 5. REGULATORY IMPACT REVIEW

5.1 Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: 1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; 2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and, 3) it ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR also serves as the basis for determining whether the regulations are a “significant regulatory action” under the criteria provided in Executive Order (E.O.) 12866. This RIR analyzes the impacts this action would be expected to have on fishing participants in the Gulf of Mexico (Gulf), particularly those that fish for shrimp or reef fish in the designated HAPCs.

5.2 Problems and Objectives

The problems and objectives addressed by this action are discussed in Section 1.2.

5.3 Description of Fisheries

A description of the affected fisheries in the Gulf is provided in Section 3.4.

5.4 Impacts of Management Measures

5.4.1 Action 1: Modify Existing HAPC Boundary for Regulations in Pulley Ridge

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.1.2. The following discussion analyzes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternative 4 would add Pulley Ridge South Portion A within Pulley Ridge North, but with separate regulations from Pulley Ridge South HAPC; the one distinction in regulations between the two areas is that the Pulley Ridge South HAPC would not allow the use of bottom longline, whereas Pulley Ridge South Portion A would allow the use of that gear. As a result of the expansion of fishing regulations, **Preferred Alternative 4** would be expected to result in negative direct economic impacts due to the expansion of fishing regulations, in contrast to **Alternative 1**. **Preferred Alternative 4** would close areas for certain gear types, which would affect both commercial and recreational fishing. Some of these losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC areas for continuous fishing. However, **Preferred**

Alternative 4 may also have positive long-term indirect economic benefits by providing protection not just to the coral and habitat on which many fishery species depend, but also to the fish themselves that are targeted commercially or recreationally, particularly if those areas act as a source for new recruits or increased productivity. Additional positive indirect economic impacts may result by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Although the direct economic impacts are not quantifiable, **Alternative 1** and **Preferred Alternative 4** can also be analyzed in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels. The existing Pulley Ridge South HAPC (**Alternative 1**) had no ELB data points or vessels from 2004-2013. There were 1,605 VMS data points and 65 unique vessels from 2007-2015, which corresponds to an annual average of 178.3 VMS data points and 7.2 unique vessels. Pulley Ridge South HAPC and Pulley Ridge South Portion A, with separate regulations for the two areas, (**Preferred Alternative 4**) had 1 ELB data point and 1 unique vessel from 2004-2013. There were 4,092 VMS data points from 2007-2015, which correspond to an annual average of 454.7 VMS data points. Through this comparison of data points, **Preferred Alternative 4** would be expected to have greater negative direct economic impacts than **Alternative 1**.

5.4.2 Action 2: New Areas for HAPC Status in the Southeastern Gulf

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.2.2. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternative 2 with **Preferred Option b** would create a new HAPC named West Florida Wall and prohibit fishing with bottom-tending gear in this area. In contrast to Alternative 1, **Preferred Alternative 2** with **Preferred Option b** would be expected to result in minor negative direct economic effects, since neither VMS nor shrimp ELB data indicates significant shrimping effort in the area. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, particularly if the areas act as a source for new recruits or increased productivity. Additional positive indirect economic impacts may result by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Although the direct economic impacts are not quantifiable, **Alternative 1** and **Preferred Alternative 2** with **Preferred Option b** can also be compared in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels. The proposed HAPC in **Preferred Alternative 2** with **Preferred Option b** had no ELB data points or vessels from 2004-2013 and 4 VMS data points and 4 unique vessels from 2007-2015.

Thus, only minor negative direct economic effects are to be expected to result from **Preferred Alternative 2** with **Preferred Option b** in comparison to **Alternative 1**.

5.4.3 Action 3: New Areas for HAPC Status in the Northeastern Gulf

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.3.2. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternative 2 with **Preferred Option b** would create the new HAPC named Alabama Alps Reef with a prohibition on fishing with bottom-tending gear. VMS data indicate that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would be negatively impacted by the prohibition on fishing with bottom-tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from **Preferred Alternative 2** with **Preferred Option b**, in comparison to **Alternative 1**. Recreational fishing could also be negatively impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity. Additional positive indirect economic impacts may result by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Preferred Alternative 3 with **Preferred Option b** would create the new HAPC named L&W Pinnacles and Scamp Reef with a prohibition on fishing with bottom-tending gear. VMS data indicate that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear and would be negatively impacted by **Preferred Option b**'s prohibition on fishing with bottom-tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from **Preferred Alternative 3** with **Preferred Option b**, in comparison to **Alternative 1**. Recreational fishing could also be negatively impacted by the gear restriction. Some of these commercial and recreational impacts would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral, but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity.

Preferred Alternative 4 with **Preferred Option b** would create the new HAPC named Mississippi Canyon 118 and prohibit the use of bottom-tending gear. As VMS and Shrimp ELB data indicate that this is not a heavily fished area, minimal negative direct economic effects would be expected to result from **Preferred Alternative 4** with **Preferred Option b**, in comparison to **Alternative 1**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational impacts would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity.

Preferred Alternative 5 with **Preferred Option b** would create the new HAPC named Roughtongue Reef with a prohibition on fishing with bottom-tending gear. VMS data indicate that this area is heavily fished; further analysis of the data indicates that most of the fishing occurs with bandit gear, which would be affected by **Preferred Option b**'s prohibition on fishing with bottom-tending gear. As a result, while not quantifiable, negative direct economic effects would be expected to result from **Preferred Alternative 5** with **Preferred Option b**, in comparison with **Alternative 1**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational impacts would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity.

Preferred Alternative 6 with **Preferred Option b** would create the new HAPC named Viosca Knoll 826 and prohibit the use of bottom-tending gear. VMS data indicate that this area is minimally fished, and further analysis of the data indicates that most of the fishing occurs with bandit gear. As a result, while not quantifiable, minimal negative direct economic effects would be expected to result from selection of **Preferred Alternative 6** with **Preferred Option b**, in comparison with **Alternative 1**. Recreational fishing could also be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity.

Preferred Alternative 7 with **Preferred Option c** would create the new HAPC named Viosca Knoll 862/906 with a prohibition on fishing with bottom-tending gear while providing an exemption for fishermen with a royal red shrimp endorsement and utilizing royal red shrimp gear. The provided exemption is due to nets commonly being retrieved and reset in this area, and contact with the coral itself does not generally occur here. While not quantifiable, negative direct economic effects would be expected to result from **Preferred Alternative 7** with **Preferred Option c**, in comparison with **Alternative 1**. The potential remains that expansion of federal shrimp permit holders into the royal red shrimp fishery could occur, which could negatively impact the biological environment in the new HAPC.

Recreational fishing could also be impacted by the gear restriction. Some of the commercial and recreational impacts would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new

HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source of new recruits or increased productivity.

The preferred alternatives can also be analyzed in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels. ELB data points and unique vessels are for the years 2004-2013, while VMS data points and unique vessels are for the years 2007-2015. These data points and unique vessels affected by **Preferred Alternatives 2-7** are displayed in Table 5.4.3.1. The presented VMS data includes both fishing and non-fishing points and therefore serves as an upper bound for potential impacts on fishing effort. The ELB data is more likely to determine fishing activity from non-fishing activity but only represents about 1/3 of federally permitted shrimp vessels.

Table 5.4.3.1. Average Annual Number of VMS and ELB data points and unique vessels affected by **Preferred Alternatives 2-7**.

Alternatives	Options	VMS		ELB	
		Average Annual Data Points	Average Annual Unique Vessels	Average Annual Data Points	Average Annual Unique Vessels
Alternative 2	**Preferred Option b**	244.6	4.8	1.1	0.6
Alternative 3	**Preferred Option b**	1,257.8	9.1	0.2	0.1
Alternative 4	**Preferred Option b**	5.1	0.9	3.6	0.6
Alternative 5	**Preferred Option b**	1,268.9	8.8	0.5	0.2
Alternative 6	**Preferred Option b**	4.6	1.0	1.2	0.3
Alternative 7	**Preferred Option c**	20.2	2.6	0	0

Source: NOAA Office of Law Enforcement, 2015 – VMS. Southeast Fisheries Science Center- 2014- ELB

5.4.4 Action 4: New Areas for HAPC Status in the Northwestern Gulf

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.4.2. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternatives 2, **3**, and **4** with **Preferred Option b** would create three new HAPCs with a prohibition on fishing with bottom-tending gear. In comparison to **Alternative 1**, minor negative direct economic effects would be expected to result, as there is little evidence of bottom-tending gear use in the area. Recreational fishing could also be negatively impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity. Additional positive indirect economic impacts may result by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Although the direct economic impacts are not quantifiable, **Preferred Alternatives 2**, **3**, and **4** with **Preferred Option b** can be compared with **Alternative 1** in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels. The AT 047 HAPC (**Preferred Alternative 2**) had 3 ELB data points and 2 unique vessels from 2004-2013. There were 2 VMS data points and 2 unique vessels from 2007-2015. The AT 357 HAPC (**Preferred Alternative 3**) had 3 ELB data points and 1 unique vessel from 2004-2013. There were 3 VMS data points and 2 unique vessels from 2007-2015. The Green Canyon 852 HAPC (**Preferred Alternative 4**) had 1 ELB data point and 1 unique vessel from 2004-2013. There were no VMS data points and no unique vessels from 2007-2015. The presented VMS data includes both fishing and non-fishing points, and therefore, serves as an upper bound for potential impacts on fishing effort through **Preferred Option b** for **Preferred Alternatives 2-4**. The ELB data is more likely to determine fishing activity from non-fishing activity but only represents about 1/3 of federally permitted shrimp vessels. From this data, only minor negative direct economic effects are to be expected to result from **Preferred Alternatives 2**, **3**, and **4** with **Preferred Option b** in comparison to **Alternative 1**.

5.4.5 Action 5: New Areas for HAPC Status in the Southwestern Gulf

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.5.2. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternatives 2 and **3** with **Preferred Option b** would create two new HAPCs named, respectively, Harte Bank and Southern Bank; fishing with bottom-tending gear would be prohibited in both of the new HAPCs. In comparison with Alternative 1, minimal negative direct economic effects would be expected to result from **Preferred Alternatives 2** and **3** with **Preferred Option b**. Examination of VMS pings along with shrimp ELB data suggests that the area is not a primary shrimping ground but rather a transit area. Recreational fishing could also potentially be impacted by the gear restriction. Some of these commercial and recreational losses would be mitigated by the shift of these activities to other areas. Commercial fishermen could incur additional operating costs if they have to avoid the new HAPC area for continuous fishing. Some positive indirect economic impacts may result by providing protection not just to coral but also to fish species that are targeted commercially or recreationally, if the areas act as a source for new recruits or increased productivity. Additional positive indirect economic impacts may result by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

Although the direct economic impacts are not quantifiable, **Preferred Alternatives 2** and **3** with **Preferred Option b** can be compared with **Alternative 1** in terms of the number of ELB data points and unique vessels as well as the number of VMS data points and unique vessels. The Harte Bank HAPC (**Preferred Alternative 2**) had 11 ELB data points and 4 unique vessels from 2004-2013. There were 274 VMS data points and 8 unique vessels from 2007-2015, which correspond to an annual average of 30.4 VMS data points and 0.9 unique vessels. The Southern Bank HAPC (**Preferred Alternative 3**) had 3 ELB data points and 2 unique vessels from 2004-2013. There was 1 VMS data point and 1 unique vessel from 2007-2015. The presented VMS data includes both fishing and non-fishing points and therefore serves as an upper bound for potential impacts on fishing effort through **Preferred Option b** for **Preferred Alternatives 2-3**. From this data, only minor negative direct economic effects are to be expected to result from **Preferred Alternatives 2** and **3** with **Preferred Option b** in comparison to **Alternative 1**.

5.4.6 Action 6: New Deep-water Coral Areas for HAPC Status Not Recommended to Have Fishing Regulations.

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.6.2. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternatives 2 through **9** would establish 8 new HAPCs. Establishing these proposed new HAPCs would not be expected to result in any direct economic impacts in comparison to **Alternative 1**. These new HAPCs may result in positive indirect economic impacts by drawing attention to the rarity and vulnerability of these coral communities, which in turn could lead to fishermen being more aware of potential gear effects as well as an increase in the intrinsic value the public places on these coral communities.

5.4.7 Action 7: Prohibit Dredge Fishing In All Existing HAPCs That Have Fishing Regulations

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.7.2. The following discussion summarizes the expected economic effects of the preferred alternative relative to the No Action alternative (i.e., the status quo).

Preferred Alternative 2 prohibits dredge fishing in currently established HAPCs. In comparison to Alternative 1, **Preferred Alternative 2** is not expected to result in direct or indirect economic effects, as dredge fishing is not a type of fishing that occurs in the Gulf EEZ. Thus, this action is administrative in nature, such that it provides consistent management measures across all currently existing HAPCs with fishing regulations.

5.5 Public and Private Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources which can be expressed as costs associated with the regulations. Costs to the private sector are discussed in Section 5.4. Estimated public costs associated with this action include:

Council costs of document preparation, meetings, public hearings, and information dissemination………………………………………………………………………$80,000

NMFS administrative costs of document
preparation, meetings and review …...$40,000

TOTAL …...$120,000

The estimate provided above does not include any law enforcement costs. Any enforcement duties associated with this action would be expected to be covered under routine enforcement costs rather than an expenditure of new funds. Council and NMFS administrative costs directly attributable to this amendment and the rulemaking process will be incurred prior to the effective date of the final rule implementing this amendment.

5.7 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is likely to result in: 1) an annual effect of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; 2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this executive order (E.O). Based on the information in Sections 5.4-5.5, the costs and benefits resulting from this regulatory action are not expected to meet or exceed the $100 million threshold, and thus this action has been determined to not be economically significant for the purposes of E.O. 12866.

CHAPTER 6. REGULATORY FLEXIBILITY ACT ANALYSIS

6.1. Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. The RFA does not contain any decision criteria; instead, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of various alternatives contained in the Fishery Management Plan for the Coral and Coral Reefs of the Gulf of Mexico, U.S. Waters (FMP) or amendment (including framework management measures and other regulatory actions). The RFA is also intended to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct a regulatory flexibility analysis for each proposed rule. The regulatory flexibility analysis is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts. In addition to analyses conducted for the RIR, the regulatory flexibility analysis provides: 1) A statement of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for the proposed rule; 3) a description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply; 4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; 5) an identification, to the extent practical, of all relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule; and, 6) a description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.

Additional information on the description of affected entities may be found in Chapter 3, and additional information on the expected economic effects of the proposed action may be found in Chapter 4.

6.2. Statement of the need for, objective of, and legal basis for the proposed action

The need for and objective of this action are discussed in Chapter 1, and are incorporated herein by reference. In summary, there is a need to conserve the Gulf of Mexico coral resources and essential fish habitat and to maintain suitable marine fishery habitat quality and quantity to support sustainable fisheries. The purpose of this action is to protect coral species and habitat under federal management in the Gulf of Mexico. The Magnuson-Stevens Fishery Conservation and Management Act provides the statutory basis for this proposed action.

6.3. Description and estimate of the number of small entities to which the proposed action would apply

The proposed action would designate several areas in the Gulf as HAPCs and establish or modify fishing regulations in HAPCs. Some these HAPCs would be subject to new fishing regulations while others would remain without new fishing regulations. As a result, this action would directly affect federally permitted commercial fishermen fishing for reef fish or shrimp. Recreational anglers fishing in the designated HAPCs would also be directly affected by this action, but anglers are not considered business entities under the RFA. For-hire vessels would also be affected by this action but only in an indirect way. Thus, only the effects on federally permitted commercial reef and shrimp fishing vessels will be discussed. For RFA purposes only, the National Marine Fisheries Service has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR § 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including affiliates), and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide.

As of July 14, 2018, there were 841 vessels with valid or renewable Federal Gulf reef fish commercial vessel permits. From 2010 through 2016, an average of 554 federally permitted commercial reef fish vessels per year landed any reef fish species in the Gulf (Table 3.4.3.1). These vessels, combined, averaged 6,608 trips per year in the Gulf on which reef fish were landed and 810 other trips (Table 3.4.3.1). The average annual total dockside revenue (2016 dollars) for these vessels combined was approximately $52.13 million from reef fish, approximately $1.32 million from other species co-harvested with reef fish (on the same trips), and approximately $1.54 million from other trips by these vessels on trips in the Gulf on which no reef fish were harvested or occurred in other areas (Table 3.4.3.2). Total average annual revenue from all species harvested by these vessels in the Gulf or other areas was approximately $54.95 million, or approximately $99,000 per vessel. These vessels generated approximately 95 percent of their total revenues from reef fish. Commercial reef fish vessels used a variety of gears in harvesting reef fish. For the period 2010-2016, an average of 68 vessels used longlines and generated revenues of approximately $250,000 per vessel; 267 vessels used bandit gear generating approximately $109,000 revenue per vessel; 273 vessels used hook-and-line generating approximately $27,000 revenue per vessel; 47 vessels used diving gear generating approximately $13,000 revenue per vessel; and, 6 vessels used other gears generating approximately $40,000 revenue per vessels.

Brown and white shrimp are the dominant shrimp species in terms of landings, ex-vessel revenues, and number of vessels participating in the Gulf shrimp fishery. For the period 2010-2016, an annual average of 3,552 vessels landed approximately 61 mp of brown shrimp with an ex-vessel value of about $206 million; an annual average of 3,914 vessels landed approximately 61 mp of white shrimp valued at about $210 million; an annual average of 175 vessels landed pink shrimp valued at about $18 million; and, an annual average of 8 vessels landed approximately 154 thousand lbs of royal red shrimp valued at about $964 thousand (Table 3.4.2.0). Not all vessels that landed Gulf shrimp are federally permitted, and not all federally permitted landed shrimp. In 2014, for example, only 74 percent of federally permitted vessels landed shrimp (Table 3.4.2.1). As of July 14, 2018, there were 1,422 valid or renewable Gulf shrimp commercial permits and 305 valid Gulf royal red shrimp endorsements. The latest data on the economics and financial conditions of the Gulf shrimp fishery are for 2014. Data for later years are still being processed and compiled. Between 2011 and 2014, the average gross revenue from fishing operations of federally permitted shrimp vessels was approximately $343,000, but net revenue from operations was only about $8,300. These estimates best approximate expected financial and economic conditions for these vessels in the foreseeable future.

Based on the foregoing revenue information, all federally permitted commercial vessels fishing for reef fish or shrimp in the Gulf potentially affected by the proposed action may be assumed to be small entities.

6.4. Description of the projected reporting, record-keeping and other compliance requirements of the proposed action

No duplicative, overlapping, or conflicting Federal rules have been identified with this proposed action.

6.5. Identification of all relevant federal rules, which may duplicate, overlap or conflict with the proposed action

The proposed action would not introduce any changes to reporting and record-keeping and other compliance requirements which are currently required.

6.6. Significance of economic impacts on a substantial number of small entities

Substantial number of small entities criterion

All entities that may potentially be affected by the proposed action have been determined, for the purpose of this analysis, to be small entities. As will be noted below, however, the various actions considered in the proposed action would directly affect only a few small entities.

Significant economic impact criterion

The outcome of "significant economic impact" can be ascertained by examining two issues: disproportionality and profitability.

<u>Disproportionality</u>: Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?

All entities that are expected to be affected by this proposed action are considered small entities, so the issue of disproportional effects on small versus large entities does not presently arise.

<u>Profitability</u>: Do the regulations significantly reduce profit for a substantial number of small entities?

Action 1 would modify the existing Pulley Ridge HAPC by adding new area, Pulley Ridge South A. Prohibited in this new area is fishing with a bottom trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels, but bottom longlining is still allowed. ELB data indicate an average of one vessel per year fished in the area. VMS data indicate that vessels fishing in the area are bottom longline or bandit fishing vessels, which would not generally be affected by the proposed action. Therefore, the economic impacts of Action 1 may be considered minimal relative to the number of shrimp and reef fish vessels operating in the Gulf.

Action 2 would establish a new HAPC in the southeastern Gulf. Fishing with bottom-tending gear, which is defined as bottom longline, bottom trawl, buoy gear, dredge, pot or trap, and bottom anchoring by fishing vessels, is prohibited in this area. VMS and ELB data indicate very low shrimp or reef fish fishing in this area, thus the economic impacts of Action 2 would be minimal.

Action 3 would establish 6 new HAPCs in the northeastern Gulf. Fishing with bottom tending-gear is prohibited in these areas. VMS data indicate an average of 1 to 9 vessels per year fished in any of these 6 areas. ELB data indicate few vessels fished these areas at any given time and most areas were not fished for several years. The exception is Alternative 7 Viosca Knoll 862/906 which is frequented by shrimp vessels fishing for royal red shrimp. Fishermen that possess a royal red shrimp endorsement are exempted from the prohibition on fishing with bottom-tending gear. Therefore, the economic impacts of these new HAPCs would be expected to be relatively minor.

Action 4 would establish 3 new HAPCs in the northwestern Gulf. Fishing with bottom tending-gear is prohibited in these areas. VMS and ELB data indicate very few vessels fished in these areas, thus the economic impacts of these new HAPCs would be expected to be minimal.

Action 5 would establish 2 new HAPCs in southwestern Gulf. Fishing with bottom tending-gear is prohibited in these areas. VMS and ELB data indicate relatively few vessels fished in these areas, thus the economic impacts of these new HAPCs would be expected to be minor.

Action 6 would establish 8 new deep-water HAPCs without fishing regulations. Except for one HAPC, Green Canyon 140 and 272, ELB and VMS data show no or very little fishing activity in these areas. For this one HAPC, ELB data indicate 1 to 2 vessels might fish in this area and VMS data indicate 3 to 8 vessels might fish in the area. VMS data points, however, show relatively few pings in this area, suggesting little, if any, fishing occurs in the area. Since no fishing regulations are proposed for these areas no economic impacts would be expected.

Action 7 would prohibit dredge fishing in all existing HAPCs that have fishing regulations. There is currently no known dredge fishing in any existing and proposed HAPCs, thus Action 7 may be expected to have no economic impacts.

There is currently no information regarding the number of trips or fishing intensity per vessel from both the ELB and VMS data. It is, therefore, not possible to estimate the revenue and profit effects of the proposed action. Inference on the extent of economic impacts is mainly based on the number of vessels potentially affected by the proposed action or on the type of vessels which would remain unaffected by the proposed fishing regulations. On such basis, the proposed action may be considered not to impose significant economic impacts on a substantial number of small entities.

6.7. Description of the significant alternatives to the proposed action and discussion of how the alternatives attempt to minimize economic impacts on small entities

Because the proposed action would not have significant adverse impacts on a substantial number of small entities, the issue of significant alternatives to the proposed action is not relevant

CHAPTER 7. LIST OF AGENCIES AND PERSONS CONSULTED

PREPARERS (Interdisciplinary Planning Team)

Name	Expertise	Responsibility	Agency
Adam Bailey	Technical writer and editor	Regulatory writer	SERO
David Dale	Biologist	Essential Fish Habitat review	SERO
Matthew Freeman	Economist	Economic analysis, Regulatory Impact Review	GMFMC
Susan Gerhart	Fishery Biologist	Reviewer	SERO
Morgan Kilgour	Biologist	Co-Team lead- Amendment development, biological analysis	GMFMC
Dennis Klemm	Biologist	Protected Resources review	SERO
Ava Lasseter	Anthropologist	Social analyses	GMFMC
Tony Lamberte	Economist	Economic analyses, Regulatory Flexibility Act Analysis	SERO
Mara Levy	Attorney	Legal review	SERO
Maria Lopez	Fishery Biologist	NEPA compliance	SERO
Matthew McPherson	Biologist	Southeast Fisheries Science Center	SEFSC
Cynthia Meyer	Fishery Biologist	Amendment development	SERO
Margaret Miller	Coral Biologist	Southeast Fisheries Science Center Review	SEFSC
Christina Package-Ward	Anthropologist	Social analyses	SERO
Rick Pearson	Fishery Biologist	Highly Migratory Species review	HMS
David Records	Economist	Economic Review	SERO
Claire Roberts	Biologist	Amendment development	GMFMC
Noah Silverman	Natural Resource Management Specialist	NEPA compliance	SERO
Carrie Simmons	Fishery biologist	Reviewer	GMFMC
Mark Sramek	Biologist	Habitat Conservation Division	SERO
Lauren Waters	Fishery Biologist	Co-Team lead-Amendment development, biological analyses	SERO

LIST OF AGENCIES CONSULTED

National Marine Fisheries Service
- -Southeast Science Center
- -Southeast Regional Office
  - -Protected Resources, Habitat Conservation, and Sustainable Fisheries
- -NOAA General Council
- -U.S. Coast Guard

Alabama Marine Resource Division
Florida Fish and Wildlife Conservation Commission
Louisiana Department of Wildlife and Fisheries
Mississippi Department of Marine Resources
Texas Parks and Wildlife Department

CHAPTER 8. REFERENCES

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APPENDIX A. CORAL WORKING GROUP SUMMARY

Coral Working Group Summary
Gulf Council Office, Tampa, FL
December 4th and 5th, 2014
9:00 a.m. - 5:00 p.m.

<u>Coral Working Group</u>
Sandra Brooke
Erik Cordes
Peter Etnoyer
John Reed
Judith Lang
Paul Sammarco
George (GP) Schmahl
<u>Others</u>
David Dale
David Hicks
Sharon McBreen
Tom Wheatley

<u>Council and Council staff</u>
Roy Williams
Beth Hager
Morgan Kilgour
Phyllis Miranda
Mark Mueller
Carrie Simmons

The overall recommendations from the Coral Working Group are as follows:

- The group recommends several "broad areas" to be recognized as the presumed, logical extent of deep-water coral habitat, based on topography, depth, and other observations incorporated through predictive habitat suitability models.
- The group recommends several "discrete areas" to be recognized as the confirmed, documented presence of deep-water coral communities.
- The group recommends that these areas be considered as Coral HAPCs as opposed to deep-sea coral areas.
- The group recommends that within the discrete zones, there be restrictions on bottom-tending gear (pots, traps, trawls, bottom longlines, deep dropping) and anchoring.
- The group recommends that the Council consider the effects of aquaculture on HAPCs and other coral areas.

- The group recommends that deep-water octocorals (defined here as species known to occur 50 m (164 ft, 27 fathoms) and deeper, e.g. *Swiftia exserta, Callogorgia delta, and Paramuricea biscaya*) be reconsidered in the FMU.

The group recognized that this process was a prime opportunity for interagency collaboration for the cooperative protection/evaluation of these areas, particularly as other Councils along the eastern US seaboard have already established deep coral HAPCs (SAFMC) or are moving towards protection for deep coral habitats (MAFMC, NEFMC). Before deciding on appropriate areas, the group discussed in great detail the appropriate methodology for drawing the boundaries of both discrete and broad areas. When adequate data were available on coral abundance, extent and community type, the group would encompass the entire feature (such as in the BOEM lease block Viosca Knoll 826) as a 'discrete' zone. Broad areas were those without survey data, were larger than discrete zones and were based on high likelihood of coral presence (similar underlying geology as known coral areas, predictive habitat models or other data that provided strong evidence of coral presence).

Each area was discussed in detail. Following are: maps of the discrete areas and an itemized list, maps of the broad areas and an itemized list. Still to come will be a detailed summary of all areas the group discussed including: size of area, species present in each area (richness), presence of protected species, fish species (if applicable) and any other useful information. These detailed reports will be geographically separated and will focus on: South Texas Banks, Northwest Gulf of Mexico, Northeast Gulf of Mexico, and West Florida. Several areas were also removed from consideration because there were not enough data.

Drs. Cordes, Brooke, and Etnoyer all contributed new information on coral presence, abundance and diversity in the northeastern Gulf of Mexico.

Mr. Schmahl and Drs. Sammarco and Cordes had new information on many areas of the northwestern Gulf of Mexico including new information on rugosity as a metric predicting species richness, increasing the information about several HAPCs (habitat areas of particular concern), and information about several new banks for consideration. There was also some discussion of the Flower Garden Banks National Marine Sanctuary's ongoing efforts to expand to include some of the banks discussed by the group in this region.

Mr. Reed and Drs. Brooke and Etnoyer provided new information about *Lophelia pertusa* and black coral areas that have been recently surveyed on the west Florida shelf and Pulley Ridge.

Dr. Hicks presented new information about the south Texas Banks and identified banks with known high densities of coral for the group. Some of these banks are Pleistocene relict reefs and others are relict barrier island features.

The meeting adjourned at December 5th at 3:30 pm.

Discrete Areas include (Figure 1):

South Texas Banks

Blackfish Ridge
Big Adam Rock
Unnamed Bank (Harte Bank)
Mysterious Banks
Dream Bank
Southern Bank
Hospital, North Hospital and Aransas Banks
Baker Bank

Northeast Gulf of Mexico

Viosca Knoll 862/906
Viosca Knoll 826
Mississippi Canyon 751 and 885
AT 357
AT 047
Mississippi Canyon 118
Roughtongue Reef and Yellowtail Reef
Patch Reef Field and Solitary Mound
L & W Pinnacles and Scamp Reef
Shark Reef, Triple Top Reef, Double Top Reef
Mountain Top Bank 3
Pinnacle 1 Near West and West Pinnacle 2
Far Tortuga
Alabama Alps Reef

Northwest Gulf of Mexico

Garden Banks 535
Green Canyon 354
Green Canyon 140 and 272
Garden Banks 299
Green Canyon 234
Horseshoe Banks
Elvers Bank
Parker Bank
Green Canyon 852
MacNeil Banks
Rankin Bright Bank
Geyer Bank
29 Fathom Bank
Bouma Bank
Rezak Sidner Bank
Sonnier Bank
Alderdice Bank
Jakkula Bank

West Florida

Long Mound
2 unnamed sites surveyed by John Reed
Many Mounds
Okeanos Ridge
Pulley Ridge

Broad Areas include (Figure 2):

South Texas Banks

South Texas Banks North Polygon
South Texas Banks South Polygon

Northeast Gulf of Mexico

Viosca Knoll 862/906
Viosca Knoll 826
Mississippi Canyon 751 and 885
AT 357
AT 047
Mississippi Canyon 118
The Pinnacles

West Florida

West Florida Slope North
West Florida Slope South

Northwest Gulf of Mexico

Garden Banks 535
Green Canyon 354
Green Canyon 140 and 272
Garden Banks 299
Green Canyon 234
Horseshoe Banks
Elvers Bank
Parker Bank
Green Canyon 852
MacNeil Banks
Rankin Bright Bank
Geyer Bank
29 Fathom Bank
Bouma Bank
Rezak Sidner Bank
Sonnier Bank
Alderdice Bank
Jakkula Bank

Figure 1. Broad overview of the discrete coral areas identified by the Coral Working Group. Note: this map does not include HAPCs or other areas with fishing regulations. This map is only the discrete areas that are not currently identified as HAPCs or coral areas, or are identified as HAPCs but have no restrictions.

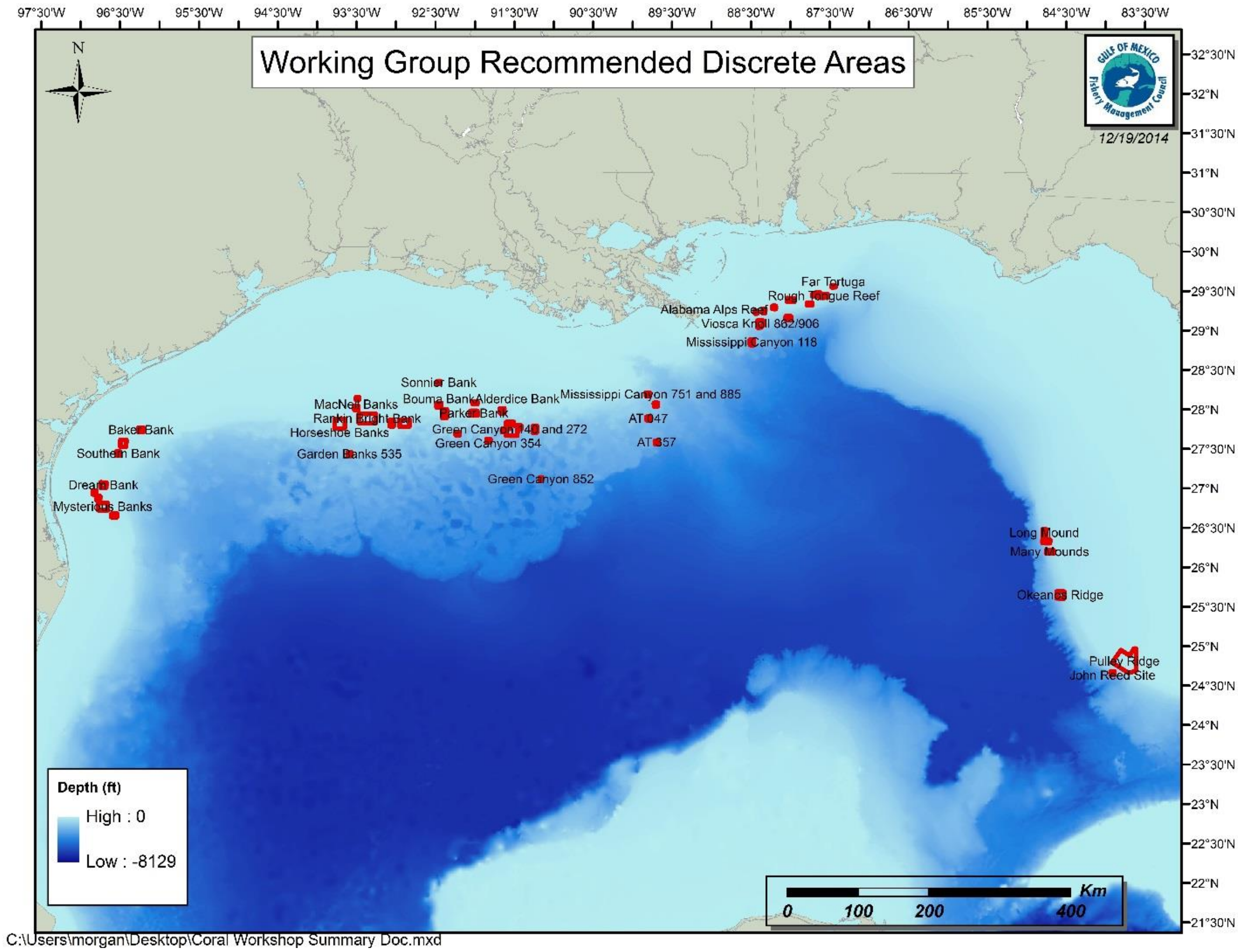
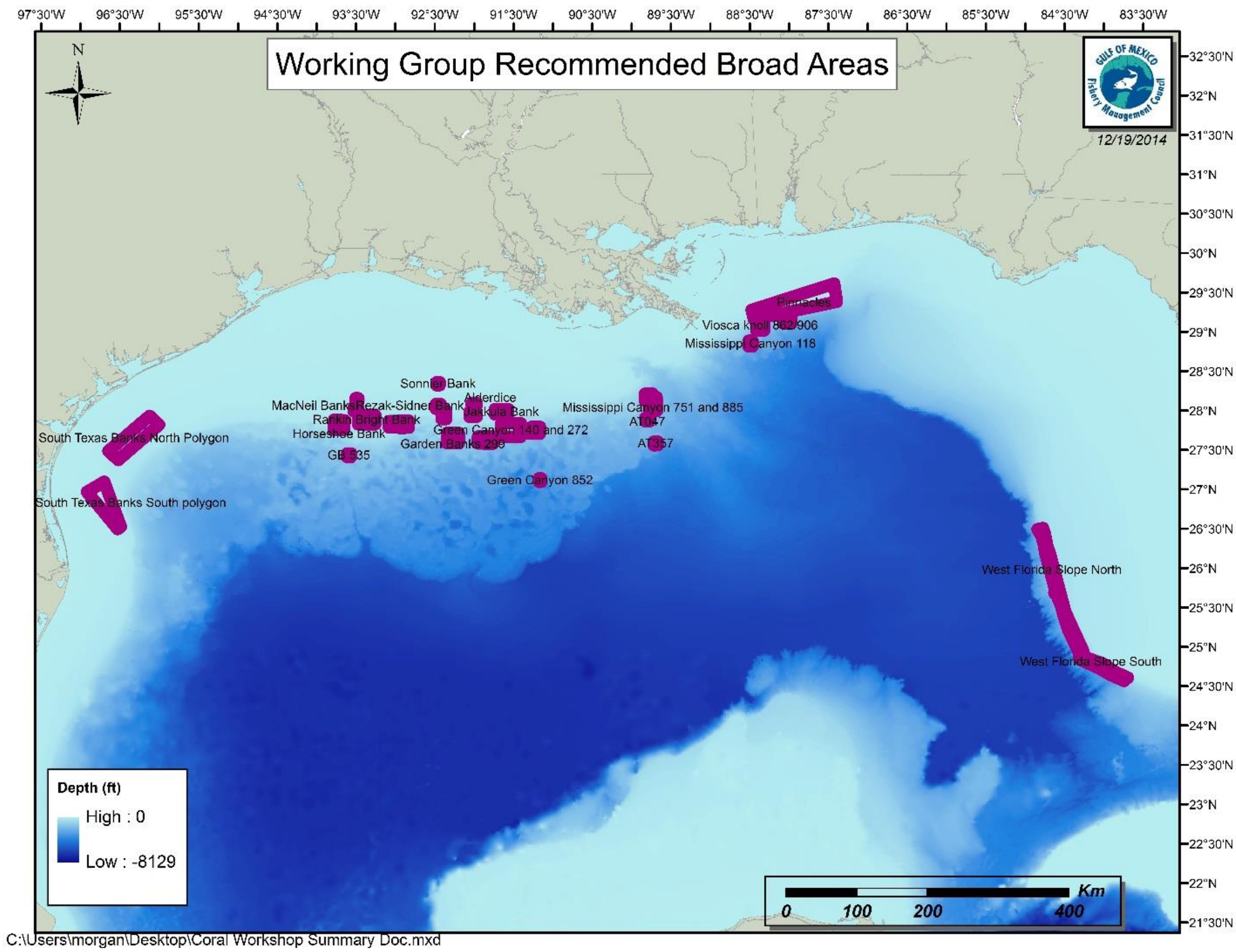


Figure 2. Broad overview of the broad coral areas identified by the Coral Working Group. Note: this map does not include HAPCs or other areas with fishing regulations. This map is only the discrete areas that are not currently identified as HAPCs or coral areas, or are identified as HAPCs but have no restrictions.



APPENDIX B. CONSIDERED BUT REJECTED

There are over 100 species of coral included in the Fishery Management Plan (FMP) for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP). Only stony and black corals are included in the fishery management unit (FMU); octocorals were removed from the FMU in the Generic Annual Catch Limit (ACL)/Accountability Measures (AM) amendment (GMFMC 2011), and Florida now manages octocorals in the federal waters off Florida as well as state waters. Only species in the FMU are managed by the Gulf of Mexico Fishery Management Council (Council). Species managed by the Council are managed through FMPs.

In 2013, the Council hosted a workshop that brought together scientists associated with both fisheries and corals to discuss how corals may be affected by fisheries. From this workshop, the group recommended that deep-water octocorals (defined here as species known to occur 164 ft (27 fathoms) and deeper, e.g. *Swiftia exserta, Callogorgia delta, and Paramuricea biscaya*) be reconsidered in the FMU. However, reefs and hard bottom occurring shallower than 600 ft (100 fathoms) are currently identified and described as necessary for spawning, feeding, breeding, or growth to maturity for Council-managed species; thus, are already listed as EFH for species in the Gulf. Whereas, octocorals deeper than that are not currently part of listed EFH for species in the Gulf.

If the Council had chosen to incorporate octocoral species into the FMU, management benchmarks would have been established. Management benchmarks include annual catch limit (ACL), maximum sustainable yield (MSY), maximum fishing mortality threshold (MFMT), and minimum stock size threshold (MSST).

The Council reviewed actions to add octocorals back into the FMU based on the SSC's recommendation. Several points were discussed regarding the appropriateness of adding them into the FMU. The information provided indicated that no octocoral species that exist exclusively below 164 ft (27 fathoms) or 492 ft (82 fathoms) were actively harvested. The only known harvest of octocorals were those that existed shallower than 164 ft (27 fathoms) in Florida state waters, and the state of Florida was already managing that harvest. It was acknowledged that octocorals provide important functions, such as habitat for fish species, but more specific information on their role in the Gulf as it relates to managed fish species is limited. At the October 2017 Council meeting the actions to add octocorals to the FMU was moved to 'considered but rejected.' The original information and actions are within this appendix.

Incorporation of Deep-Water Octocoral Species into the Gulf of Mexico (Gulf) Fishery Management Unit (FMU)

Alternative 1: No Action. Do not incorporate deep-water octocorals into the Gulf FMU.

Alternative 2: Incorporate into the Gulf FMU, all genera of octocorals (members of Order Alcyonacea) that have been recorded in the Gulf and are in the National Oceanic and Atmospheric Administration (NOAA) Deep-sea coral database[45].*

Option a. Federal management applies to octocorals throughout entire Gulf exclusive economic zone (EEZ).

Option b. Federal management excludes octocorals in the EEZ off Florida.

Alternative 3: Incorporate into the Gulf FMU, only those deep-water octocoral genera (members of Order Alcyonacea) that have been recorded in the NOAA Deep-sea coral database[2] from a depth of 50 m (164 feet) or deeper in the Gulf.*

Option a. Federal management applies to octocorals throughout entire Gulf EEZ.

Option b. Federal management excludes octocorals in the EEZ off Florida.

Alternative 4: Incorporate into the Gulf FMU, only those deep-water octocoral genera (members of Order Alcyonacea) that have been recorded in the NOAA Deep-sea coral database[2] from a depth of 150 m (492 feet) or deeper in the Gulf.*

Option a. Federal management applies to octocorals throughout entire Gulf EEZ.

Option b. Federal management excludes octocorals in the EEZ off Florida.

***Note:** See Table 2.1.1 for a complete list of genera that would be included within each alternative. These depths are the depths recorded in the database from observed corals and are not the minimum recorded depths based on scientific literature, because some species have depth descriptions from waters not in the Gulf. Additionally, these alternatives are not instituting a regulation regarding depth at which a coral can be harvested, but are using a minimum depth as a metric to establish which octocorals would be incorporated into the FMU. Genera that are known to be harvested (but are not in the database as occurring in depths shallower than 50 m) have also been removed from the table for Alternatives 3 and 4.

[45] The NOAA deep sea coral database can be found at https://deepseacoraldata.noaa.gov/

Discussion:

Regional fishery management councils are required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to prepare a fishery management plan (FMP) for each fishery under its authority that requires or is in need of conservation and management; this can include stocks that are an important component of the environment. While octocorals were originally included in the Fishery Management Plan for Coral and Coral Reefs of the Gulf of Mexico (Coral FMP) (GMFMC and SAFMC 1990), they were removed from the Coral FMP through the Generic Annual Catch Limits and Accountability Measures Amendment (Generic ACL/AM Amendment) (GMFMC 2011). The goal of that action was to reduce redundancy in management as Florida was already monitoring the quota for harvestable octocorals for the aquarium trade. However, there are many deep-water octocorals that are not harvested.

While scientific research is still sparse, information about the importance of deep-water octocorals as habitat for species like catsharks (Family Scyliorhinidae) and redfishes (*Sebastes* spp.) has significantly increased since their removal from the FMU (Baillon et al. 2012). The importance and vulnerability of deep-water coral ecosystems makes them of particular conservation concern. Many gorgonians are susceptible to impacts such as oil and gas exploration and bottom trawling. If impacted, many gorgonian species are slow growing, so recovery takes longer than in shallow waters where nutrients are more abundant. Habitats formed by, and associated with, corals and sponges have been identified as priorities for deep-sea conservation in the U.S. (NOAA, 2010) and internationally (Convention on Biological Diversity, 2008; Food and Agriculture Organization, 2009). Octocoral diversity peaks at depths between 50 m and 800 m depth, with several recent studies increasing information about species diversity at different depths and bottom types, as well genetic differentiation throughout the Gulf (Boland et al. 2016). The ecosystem services provided by deep-sea octocorals are numerous, including providing food for higher trophic levels and habitat for commercially important species (Thurber et al., 2014). The sediment fauna found adjacent to corals are also influenced by their presence (Demopoulos et al. 2014), and the influence of deep-sea octocorals on the ecology and biodiversity of the surrounding habitats is extensive.

The Gulf of Mexico Fishery Management Council's (Council) Special Coral Scientific and Statistical Committee (Coral SSC) and Coral Advisory Panel (Coral AP) met in December 2014, and recommended that the Council add deep-water octocorals (those primarily in waters deeper than 164 ft [50 m]) back into the FMU so that those octocoral species can be considered when designating habitat areas of particular concern (HAPCs). A comprehensive list of octocorals and their associated depth ranges recorded in NOAA's Deep-sea Coral Database documented in the Gulf is contained in Appendix C.

Currently, there is no federal management of the harvest or take of octocorals in the Gulf EEZ because they are not part of the FMU, and those octocorals deeper than 492 ft (150 m) are not considered within the definition of EFH for Council-managed species. Reefs and hard bottom occurring shallower than 600 ft (100 fathoms) are currently identified and described as necessary for spawning, feeding, breeding, or growth to maturity for Council-managed species; thus, octocorals deeper than that are not currently part of listed EFH for species in the Gulf. Species must be part of the FMU to have management measures developed.

Table 2.1.1. List of octocoral genera and the minimum depth have been recorded in the Gulf of Mexico as reported by the NOAA Deep-sea coral database or are listed in the comprehensive compilation of Etnoyer and Cairns 2017. The listing of the shallowest depth was used to eliminate genera from Alternatives. An "X" indicates it will be included genera in the alternative.

Octocoral Family	Octocoral Genus and Species	Depth of Recorded Occurrence All genera (Alternative 2)	≥ 50 m (Alternative 3)	≥ 150 m (Alternative 4)
Acanthogorgiidae				
	Acanthogorgia spp. (*A. armata*, *A. aspera*, *A. schrammi*, *A.* sp.)	X		
Alcyoniidae				
	Anthomastus sp.	X	X	
	Bathyalcyon robustum	X	X	
	Bathyalcyon sp.	X	X	X
	Bellonella sp.	X	X	
Anthothelidae				
	Anthothela spp. (*A. grandiflora*, *A. tropicalis*, *A.* sp.)	X	X	X
	Iciligorgia schrammi	X		
Chrysogorgiidae				
	Chrysogorgia spp. (*C. elegans*, *C. fewkesii*, *C.* sp.)	X	X	X
	Iridogorgia spp (*I. magnispiralis*, *I. pourtalesii*, *I. splendens*, *I.* sp.)	X	X	X
	Trichogorgia sp.	X	X	
Clavulariidae				
	Carijoa spp. (*C. operculata*, *C. riisei)*	X		
	Clavularia sp. (*Clavularia rudis*)	X	X	X
	Scleranthelia rugosa	X	X	
	Telesto spp. (*T. flavula*, *T. fruticulosa*, *T. nellaea*, *T. sanguinea)*	X		
	Telestula tubaria	X	X	X
Corallidae				
	Hemicorallium spp.	X	X	X
Elliselidae				
	Ellisella spp. (*E. atlantica*, *E. barbadensis*, *E. elongata*, *E. funiculina*, *E. schmitti*, *E.* sp.)	X		
	Nicella spp. (*N. americana*, *N. deichmannae*, *N. flagellum*, *N. goreaui*, *N. guadalupensis*, *N. hebes*, *N. obesa*, *N. robusta*, *N. spicula*, *N. toeplitzae*, *N.* sp.)	X		
	Riisea paniculata	X	X	
Gorgoniidae				
	Leptogorgia spp. (*L. barbadensis*, *L. cardinalis*, *L. euryale*, *L. medusa*, *L. stheno*, *L.* sp.)	X		

Octocoral Family	Octocoral Genus and Species	Depth of Recorded Occurrence		
		All genera (Alternative 2)	≥ 50 m (Alternative 3)	≥ 150 m (Alternative 4)
	Phyllogorgia dilatata	X	X	
	Pterogorgia sp.	X		
Isididae				
	Acanella spp. (*A. eburnea*, *A. arbuscula*, *A.* sp.)	X	X	X
	Chelidonisis spp. (*C. aurantiaca*, *C.* sp.)	X	X	X
	Isidella sp.	X	X	X
	Keratoisis spp (*K. flexibilis*, *K.* sp.)	X	X	X
	Lepidisis spp. (*L. caryophyllia*, *L.* sp.)	X	X	X
	Stenisis humilis	X	X	X
Keroeididae				
	Thelogorgia spp. (*T. stellata*, *T. studeri*, *T.* sp.)	X	X	
Nephtheidae				
	Pseudodrifa spp. (*P. nigra*, *P.* sp.)	X	X	X
Nidaliidae				
	Chironephthya spp (*C. agassizii*, *C. caribaea*, *C.* sp.)	X		
	Nidalia spp. (*N. dissidens*, *N. occidentalis*, *N.* sp.)	X		
	Siphonogorgia spp. (*S. agassizii*, *S.* sp.)	X	X	
Paragorgiidae				
	Paragorgia spp. (*P. johnsoni*, *P. regalis*, *P.* sp.)	X	X	X
	Sibogagorgia spp. (*S. cauliflora*, *S.* sp.)	X	X	X
Plexauridae				
	Acanthacis sp.	X	X	
	Bebryce spp. (*B.cinerea*, *B. grandis*, *B. parastellata*, *B.* sp.)	X		
	Diodogorgia spp. (*D. nodulifera*, *D.* sp.)	X		
	Heterogorgia sp.	X	X	
	Hypnogorgia spp. (*H. pendula*, *H.* sp.)	X		
	Lytreia spp. (*L. plana*, *L.* sp.)	X		
	Muricea spp (*M. atlantica*, *M. pendula*, *M.* sp.)	X		
	Muriceides spp. (*M. hirta*, *M. kenthali*, *M.* sp)	X	X	
	Paramuricea spp. (*P. biscaya*, *P. multispina*, *P.* sp.)	X	X	
	Placogorgia spp. (*P. mirabilis*, *P. rudis*, *P. tenuis*, *P. tribuloides*, *P.* sp.)	X	X	
	Plexaurella nutans	X	X	

Octocoral Family	Octocoral Genus and Species	Depth of Recorded Occurrence		
		All genera (Alternative 2)	≥ 50 m (Alternative 3)	≥ 150 m (Alternative 4)
	Scleracis spp. (*S. guadalupensis*, *S. petrosa*, *S.* sp.) 50-540 m	X	X	
	Spinimuricea atlantica	X	X	
	Swiftia spp. (*S. casta*, *S. exserta*, *S. koreni*, *S. pallida*, *S.* sp.)	X		
	Thesea spp. (*T. citrina*, *T. grandiflora*, *T. granulosa*, *T. guadalupensis*, *T. nivea*, *T. nutans*, *T. parviflora*, *T. rubra*, *T. rugosa*, *T.* sp.)	X		
	Villogorgia spp. (*V. nigrescens*, *V.* sp)	X	X	
Primnoidae				
	Acanthoprimnoa spp. (*A. goesi*, *A. pectinata*)			
	Callogorgia spp. (*C. americana*, *C. delta*, *C. gracilis*, *C. linguimaris*, *C. verticillata*, *C.* sp.)	X	X	
	Calyptrophora trilepis	X	X	X
	Candidella imbricata	X	X	X
	Narella sp.	X	X	X
	Paracalyptrophora spp. (*P. carinata*, *P.* sp.)	X	X	X
	Plumarella spp. (*P. dichotoma*, *P. pourtalesii*, *P.* sp.)	X	X	X

Octocorals, by family, that are under consideration for incorporation into the FMU are presented in Table 2.1.1. Scientific experts and harvesters recognize that identifying octocorals to the species level while in the water is impossible for some species; some species can only be identified using laboratory techniques. Thus, it has been recommended that the Council consider adding higher level taxonomic groups (such as genus or family as presented in Table 2.1.1) when considering whether or not to incorporate octocorals into the FMU, to alleviate potential errors from harvesters of shallow-water species. Table 2.1.1 lists the species that have been documented in the Gulf and the minimum depths in which they occur (in NOAA's Deep-sea Coral Database) relative to **Alternatives 2**, **3**, and **4**.

Currently, Florida manages the harvest of octocorals in state and adjacent federal waters. Recreational collectors must possess a state saltwater fishing license and are limited to six colonies per day. Commercial collectors must possess a Saltwater Products License with the Restricted Species and Marine Life Tiered endorsements. Collection of octocoral must be by hand and all applicable gear restrictions apply. The quota for octocorals is 70,000 colonies annually with harvest closing if the state quota is met. Harvest of attached substrate is limited to within 1 inch of the base; and harvest of *Gorgonia flabellum* (venus sea fan), *Gorgonia ventalina* (common [purple] sea fan), and non-erect or encrusting octocorals is prohibited (Florida

Administrative Code 68B-42)[46]. Florida specifies that harvest is not to occur in HAPCs in the Atlantic (Florida Administrative Code 68B-42.0036). Appendix C provides detailed information on historic commercial octocoral harvest as report to the Florida Fish and Wildlife Conservation Commission (FWC) (https://publictemp.myfwc.com/FWRI/PFDM/; S. Brown, FWC, pers. comm.).

The most common species collected include those that are likely to survive in an aquarium and are easy to collect (i.e. relatively close to shore and inhabiting shallow (less than 164 ft [50m]) areas) (N. Sheridan, FWC, pers. comm). Table 2.1.2 provides information on the minimum, maximum, and mean average depth that octocorals have been collected in Florida state and adjacent federal waters. The maximum reported depth of harvest in federal waters was approximately 103 ft (31 m) in 1996, and the deepest average depth of harvest was approximately 60 ft (16 m) in 2007.

Alternative 1 would maintain the status quo and be the least protective measure. Octocorals would not be part of the FMU, and harvest of octocorals in federal waters of the Gulf, would not be managed by the Council and the National Marine Fisheries Service (NMFS). It is unknown if octocorals are harvested in other parts of the EEZ. If the Council selects any alternative other than **Alternative 1**, it will be necessaryto establish management threshholds and stock status criteria (see Action 2).

Alternative 2, **Option a** would incorporate all octocoral genera that have been recorded from the Gulf and are included in NOAA's deep-sea coral database into the FMU (Table 2.1.1). This would be the most protective measure for octocorals allowing for management of all deep-sea species found throughout federal waters. There are nine genera in **Alternative 2** (*Diodogorgia*, *Ellisella*, *Iciligorgia, Nicella*, *Leptogorgia*, *Hypnogorgia*, and *Muricea*, *Pterogorgia*, *Swiftia*) that occur both above and below depths shallower than 50 m (164 ft), and are possibly currently harvested. **Alternative 2**, **Option a** would remove Florida's authority to manage harvest of the listed octocoral genera in the Gulf EEZ adjacent to state waters. This would not necessarily change the harvest within federal waters adjacent to Florida, because while several species within **Alternative 2** exist above and below 50 m (164 ft), the Council could set harvest limits to allow for collection (see Action 2). **Alternative 2**, **Option b** would incorporate all octocoral genera that have been recorded from the Gulf and are included in NOAA's deep-sea coral database into the FMU, but would exclude those octocoral colonies in the EEZ adjacent to Florida state waters from federal management. **Alternative 2**, **Option b** would allow Florida to continue to manage the ocotocorals in the EEZ adjacent to state waters and would be unlikely to change the current harvest of octocorals in the Gulf EEZ since the only known harvest occurs off the state of Florida.

Alternative 3, **Option a** would incorporate into the FMU, only those octocoral genera that have been documented in the Gulf in NOAA's Deep-sea coral database in depths equal to or deeper than 50 m (164 ft) (Table 2.1.1). At its December 2014, meeting, the Coral Working Group recommended that octocorals documented at 50 m (164 ft) or deeper be included in the FMU. The genera listed in **Alternative 3** are not known to be harvested as this alternative includes

[46] http://myfwc.com/fishing/saltwater/recreational/aquarium-species

genera that have only been recorded at depths below recommended diving levels (greater than 130 feet) (Brylske 2006); and technical diving (those not using compressed air, but instead using

Table 2.1.2. Depth, in feet (ft), octocorals were harvested from within the Gulf according to commercial trip ticket reports from 1996 – 2016.

	Gulf Waters	Mean Depth (ft)	Minimum Depth	Maximum Depth (ft
1996	Federal Waters	35.4	7.9	103.0
	State Waters	11.5	3.9	20.0
1997	Federal Waters	38.7	3.0	75.1
	State Waters	12.1	3.9	33.1
1998	Federal Waters	38.7	29.9	89.9
	State Waters	19.7	2.0	44.9
1999	Federal Waters	37.4	29.9	47.9
	State Waters	19.0	3.0	44.9
2000	Federal Waters	35.1	20.0	46.9
	State Waters	17.1	3.0	44.9
2001	Federal Waters	37.4	24.9	49.9
	State Waters	14.1	1.0	40.0
2002	Federal Waters	38.7	12.1	49.9
	State Waters	16.4	1.0	46.9
2003	Federal Waters	42.3	29.9	65.0
	State Waters	12.1	1.0	44.9
2004	Federal Waters	41.3	24.9	55.1
	State Waters	16.4	1.0	44.9
2005	Federal Waters	42.0	24.9	75.1
	State Waters	13.1	1.0	44.9
2006	Federal Waters	49.9	24.9	69.9
	State Waters	11.8	2.0	45.9
2007	Federal Waters	53.5	29.9	60.0
	State Waters	12.1	1.0	44.9
2008	Federal Waters	49.9	20.0	100.1
	State Waters	12.8	2.0	45.9
2009	Federal Waters	44.9	29.9	69.9
	State Waters	17.1	3.0	60.0
2010	Federal Waters	42.7	19.0	69.9
	State Waters	12.5	1.0	89.9
2011	Federal Waters	40.7	20.0	49.9
	State Waters	10.2	1.0	44.9
2012	Federal Waters	40.4	29.9	60.0
	State Waters	9.8	1.0	44.9
2013	Federal Waters	36.7	27.9	69.9
	State Waters	10.8	2.0	46.9
2014	Federal Waters	33.8	27.9	75.1
	State Waters	9.8	1.0	45.9
2015	Federal Waters	34.1	24.9	80.1
	State Waters	10.5	1.0	44.9
2016	Federal Waters	32.2	20.0	60.0
	State Waters	10.8	1.0	29.9

Source: S. Brown, FWC, pers.comm.

a mix) is recommended below 190 feet (AAUS as accessed on August 20, 2017). Furthermore, octocorals are required to be harvested by hand and the genera listed in **Alternative 3** have only been recorded at depths below those reported in commercial landings data provided by FWC (Table 2.1.2). Therefore it is unlikely that **Alternatives 3** will affect the current harvesting off Florida. **Alternative 3**, **Option b** would incorporate only those octocoral genera that have been documented in the Gulf in NOAA's Deep-sea coral database in depths equal to or deeper than 50 m (164 ft), but would exclude those octocoral colonies in the EEZ adjacent to Florida state waters from federal management. It is unlikely this would change the current harvest of octocorals in the Gulf EEZ since the only known harvest occurs off the state of Florida.

Alternative 4, **Option a** would incoporate in the FMU, only those octocoral genera that have been documented in NOAA's deep-sea coral database to exist at 150 m (492 ft) or deeper in the Gulf (Table 2.1.1). At its December 2014, meeting, the Coral Working Group recommended that octocorals documented at 50 m (164 ft) or deeper be included in the FMU. The genera listed in **Alternative 4** are not known to be harvested as this alternative includes genera that have only been recorded at depths below recommended diving levels (greater than 130 feet) (Brylske 2006); and technical diving (those not using compressed air, but instead using a mix) is recommended below 190 feet (AAUS as accessed on August 20, 2017). Furthermore, octocorals are required to be harvested by hand and the genera listed in **Alternative 4** have only been recorded at depths below those reported in commercial landings data provided by FWC (Table 2.1.2). Therefore it is unlikely that **Alternatives 4** will affect the current harvesting off Florida. **Alternative 4**, **Option b** would incorporate only those octocoral genera that have been documented in the Gulf in NOAA's Deep-sea coral database in depths equal to or deeper than 150 m (492 ft), but would exclude those octocoral colonies in the EEZ adjacent to Florida state waters from federal management. It is unlikely this would change the current harvest of octocorals in the Gulf EEZ since the only known harvest occurs off the state of Florida.

If the Council selects any of **Alternatives 2**, **3**, or **4** as preferred, it will be necessary, in accordance with the Magnuson-Stevens Act, to establish management thresholds and stock status criteria (see Action 2).

Establish Management Benchmarks for Octocoral Species.

Alternative 1: No Action. Management benchmarks will not be established for octocorals.

Alternative 2: Do not allow harvest of octocorals in the FMU (established in Action 1) in the EEZ. ACL = 0 and maximum sustainable yield (MSY) = 0. Maximum fishing mortality threshold (MFMT) and minimum stock size threshold (MSST) are not set, as harvest is prohibited.

Alternative 3: Allow harvest of octocorals in the FMU (established in Action 1) in the EEZ. _One suboption from each option below should be selected by the Council_:

- **Option a**: Establish MSY
  - **Suboption a**: MSY proxy= OFL
  - **Suboption b:** MSY proxy = OFL reduced for uncertainty based upon SSC recommendations.

Option b: Establish an overfishing threshold (MFMT)
Suboption a: MFMT= the harvest rate that results in the annual yield equal to the biomass MSY proxy
Suboption b: MFMT proxy = OFL; if the OFL is exceeded, then overfishing is occurring
Option c: Establish an overfished threshold (MSST)
Suboption a: MSST= 0.75* B_{MSY} (or proxy)
Suboption b: MSST= 0.5* B_{MSY} (or proxy)
Option d: ACL
Suboption a: ACL= annual biological catch (ABC)
Suboption b: ACL = ABC reduced for uncertainty based upon SSC recommendations

Discussion:

This action is dependent on the Council selecting an alternative to manage octocorals in Action 1 (Alternatives 2, 3, or 4). The Magnuson-Stevens Act requires each FMP to include a scientifically measurable definition of overfishing and an action plan to stop overfishing should it occur. Since 2007, to prevent overfishing, fishery management councils within the U.S. have developed and implemented ACLs and accountability measures (AMs) under all fishery management plans for species with life histories that exceed 12 months (unless the average age of spawners is less than 12 months) and are not under international cooperative management. Should the Council select Alternative 2, Alternative 3, or Alternative 4 in Action 1, management benchmarks would need to be established. Additionally, all octocorals listed in the Council's preferred alternative in Action 1 (Table 2.2.1) will be treated as a stock complex as it is impossible to do single species assessments. At this time, the Council has neither a recommendation for management benchmarks nor an SSC approved OFL and ABC for octocorals. However, it is appropriate to discuss the methodology regarding the management benchmarks and how these benchmarks (**Alternatives 2** and **3**) should be set in the absence of hard number recommendations from the SSC.

Table 2.2.1. Total colonies landed in Atlantic (state and federal) waters and Gulf (state and federal) waters, from 1996 to 2016.

Year	Region (state and federal)	Landings (# colonies)	Trips	Value ($)	Total Landings (# colonies)
1996	Atlantic	34,734	542	92,295.61	
	Gulf	2,323	160	11,456.47	37,057
1997	Atlantic	38,792	598	84,727.69	
	Gulf	6,075	127	20,139.75	44,867
1998	Atlantic	34,583	620	74,824.42	
	Gulf	6,160	212	16,224.35	40,743
1999	Atlantic	29,429	531	65,307.45	
	Gulf	7,192	259	16,362.34	36,621
2000	Atlantic	33,633	619	85,277.49	
	Gulf	9,467	378	22,636.08	43,100
2001	Atlantic	35,056	626	89,535.34	
	Gulf	10,838	330	29,768.86	45,894
2002	Atlantic	29,375	570	70,470.93	
	Gulf	8,763	311	25,259.75	38,138
2003	Atlantic	34,817	643	88,764.74	
	Gulf	9,667	283	28,374.17	44,484
2004	Atlantic	33,725	707	90,217.38	
	Gulf	10,033	312	29,760.13	43,758
2005	Atlantic	31,408	646	90,770.21	
	Gulf	10,044	259	28,745.25	41,452
2006	Atlantic	39,626	740	119,173.69	
	Gulf	8,954	266	24,404.55	48,580
2007	Atlantic	35,075	593	112,359.26	
	Gulf	9,198	271	33,400.00	44,273
2008	Atlantic	33,270	544	115,314.80	
	Gulf	9,372	282	36,714.61	42,642
2009	Atlantic	34,378	527	91,059.38	
	Gulf	8,103	257	33,473.50	42,481
2010	Atlantic	22,069	479	77,665.85	
	Gulf	10,270	218	54,021.12	32,339
2011	Atlantic	22,218	476	75,991.35	
	Gulf	6,724	225	25,789.00	28,942
2012	Atlantic	24,442	383	88,814.00	
	Gulf	8,786	242	39,025.25	33,228
2013	Atlantic	23,507	479	88,969.29	
	Gulf	13,813	293	50,343.10	37,320
2014	Atlantic	27,160	572	99,570.50	
	Gulf	9,238	258	42,103.75	36,398
2015	Atlantic	25,027	512	102,709.89	
	Gulf	8,159	201	27,422.25	33,186
2016	Atlantic	22,323	437	85,008.30	
	Gulf	8,106	203	35,889.00	30,429

Source: S. Brown, FWC, pers. comm.

The original Coral FMP established no harvest (ACL = 0) of stony corals, black corals, and sea fans for several reasons. It was known that stony corals and sea fans had slow growth and their value was based in non-consumptive capacities, additionally impacts to these species came from multiple sources due to sedentary nature and inability to escape human impacts. So for practical purposes these were considered to be non-renewable resources which should not be harvested (GMFMC and SAFMC 1982). Also it was acknowledged that there was a lack of information for the management unit to calculate MSY or other management benchmarks. However, there was an allowable octocoral harvest because there was an existing fishery that was considered relatively small and not likely to significantly increase (GMFMC and SAFMC 1982). Amendment 1 of the Coral FMP set the allowable annual harvest of 50,000 colonies of gorgonians for both the South Atlantic and Gulf (except prohibited sea fans [see Section 1.3]) (GMFMC and SAFMC 1990). Currently, Florida allows 70,000 octocoral colonies to be harvested annually from both state and federal waters in the Gulf and Atlantic. Total reported commercial landings from 1996 to 2016 indicates that harvest has never exceeded the previous federal quota of 50,000 colonies, or the Florida state quota of 70,000 colonies (Table 2.2.1). The average landings of octocorals in the Gulf over the past ten years is 9,177, with an average of 5,052 colonies harvested in federal waters, and 4,125 harvested in state waters.

Alternative 1 would comply with the requirements of the Magnuson-Stevens Act only in the event that the Council chooses to maintain status quo and selects Alternative 1 in Action 1. **Alternative 1** would not comply with the requirements of the Magnuson-Stevens Act if the Council selects Alternative 2, 3, or 4 in Action 1.

Alternative 2 would prohibit the harvest of the octocoral genera selected in Action 1 and establish an ACL = 0 and MSY = 0. The MFMT and MSST would not be necessary to set, as harvest is prohibited.

Should the Council decide upon Alternatives 2, 3, or 4 in Action 1, the SSC would need to set an overfishing limit (OFL) and an ABC. The acceptable biological catch control rule (ABC control rule) developed by the Council's SSC to set OFL and ABC for a stock determines the appropriate level of risk and/or buffer to set between the OFL and ABC based on the amount of information for a given stock. The OFL, is the point at which fishing seriously compromises the octocoral communities' sustained productivity and is the annual amount of catch that corresponds to the estimate of MFMT. Stocks with less information have greater scientific uncertainty, so the buffer between the OFL and ABC should be more. The ABC may not exceed the OFL. At this time there has been no stock assessment of octocorals in the Gulf, and scientific research on stock status, spawning, etc. is limited. If the Council chooses to establish these management benchmarks, the SSC would need to review the existing information on octocoral stocks to provide recommendations on these benchmarks. The SSC may also make recommendations regarding the ACL, MSY, overfishing threshold (MFMT or proxy), and overfished threshold (MSST or proxy).

MSY serves as a maximum limit on harvest which cannot be exceeded. The lack of sufficient data on biomass and mortality prevents any meaningful calculation of MSY; thus an SPR based proxy would be meaningless as there is no way to quantify the MSST or MFMT with respect to SPR. Under the national standard 1 guidelines, MSST and MFMT must be measureable. Some measurement other than spawning potential ratio (SPR) is needed to evaluate MSY. One possibility is to set the MSY proxy equal to the constant catch OFL as determined by either Tier 3 of the ABC control rule or by a data-limited method. When data are insufficient to estimate MSY directly, the Council can use other measures of productive capacity as proxies for MSY. Therefore, establishing an MSY proxy either equal to the OFL, or an OFL that has been reduced based on uncertainty (as recommended by the SSC) are appropriate metrics for the Council to consider. **Alternative 3**, **Option a**, **Suboption a** or **b** would meet the criteria of being equal to or less than the OFL. **Alternative 3**, **Option a**, **Suboption a** would set a higher overfishing limit than **Alternative 3**, **Option a**, **Suboption b**.

The Sustainable Fisheries Act (SFA) guidelines provide that each FMP must specify, to the extent possible, objective and measurable status determination criteria for each stock or stock complex and provide an analysis of how the criteria were chosen and how they relate to reproductive potential. The guidelines provide that the status determination criteria must have both an MFMT or reasonable proxy thereof, and an MSST or reasonable proxy thereof.

The MFMT is the level of fishing mortality on an annual basis, above which overfishing is occurring. The MFMT, or reasonable proxy, may be expressed either as a single number (a fishing mortality rate), or as a function of spawning biomass or other measure of reproductive potential. **Alternative 3**, **Option b**, **Suboption a** would set an MFMT to harvest rate that would result in the annual yield equal to the biomass MSY proxy (set by **Alternative 3**, **Option a**). Alternatively, since the OFL is the annual amount of catch (expressed in terms of numbers or weight of harvest) that corresponds to the estimate of MFMT, **Alternative 3**, **Option b**, **Suboption b** would set an MFMT proxy equal to the OFL, and if the OFL is exceeded then overfishing is occurring. **Alternative 3**, **Option b**, **Suboption a** would require calculating a harvest rate that would correspond to the OFL which has not yet been reviewed by the SSC.

The MSST is the level of biomass below which the capacity of the stock or stock complex to produce MSY on a continuing basis has been jeopardized. The MSST should be expressed in terms of spawning biomass or other productive capacity, and that to the extent possible, the stock size threshold should be no less than one-half MSY stock size. The current stock size of octocorals (B_{MSY}, where B is the biomass of the stock at MSY) is unknown, and a stock assessment would be necessary as well as guidance from the SSC on appropriate MSST or proxy. Until a stock assessment is conducted/possible, the MSST definition is a placeholder until B_{MSY} (or proxy) can be calculated. **Alternative 3**, **Option c**, **Suboptions a** and **b** would fulfill the provisions of the SFA, with **Alternative 3**, **Option c**, **Suboption b** being the least conservative.

The SSC will be provided with information and asked to recommend an ABC and other parameters at its January 2018 meeting. In accordance with national standard 1 guidelines the ACL cannot exceed the ABC. **Alternative 3**, **Option d** provides two avenues for establishing an ACL that is based upon the ABC. The Council may consider setting the ACL equal to the ABC (**Alternative 3**, **Suboption a**) which would be consistent with how the Council has approached other data-poor species (such as spiny lobster and coastal migratory pelagics; GMFMC 2017). If the Council would like to reduce the ACL based on uncertainty **Alternative 3**, **Option d**, **Suboption b** provides this alternative based on the best scientific advice of the SSC. The Council must also establish AMs if it sets an ACL.

An allowance for harvest of octocorals for research and scientific purposes and unintentional harvest would be consistent with other coral complexes and should be discussed by the Council at the time that it discusses codified text.

APPENDIX C. OTHER APPLICABLE LAW

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for fishery management in federal waters of the exclusive economic zone. However, fishery management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making are summarized below.

Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day waiting period from the time a final rule is published until it takes effect.

Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act of 1972 (CZMA), as amended, requires federal activities that affect any land or water use or natural resource of a state's coastal zone be conducted in a manner consistent, to the maximum extent practicable, with approved state coastal management programs. The requirements for such a consistency determination are set forth in NMFS regulations at 15 C.F.R. part 930, subpart C. According to these regulations and CZMA Section 307(c)(1), when taking an action that affects any land or water use or natural resource of a state's coastal zone, NMFS is required to provide a consistency determination to the relevant state agency at least 90 days before taking final action.

Upon submission to the Secretary, NMFS will determine if this plan amendment is consistent with the Coastal Zone Management programs of the states of Alabama, Florida, Louisiana, Mississippi, and Texas to the maximum extent possible. Their determination will then be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs for these states.

Data Quality Act

The Data Quality Act (DQA) (Public Law 106-443) effective October 1, 2002, requires the government to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).
Specifically, the DQA directs the Office of Management and Budget to issue government wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and

maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." Such guidelines have been issued, directing all federal agencies to create and disseminate agency-specific standards to: 1) ensure information quality and develop a pre-dissemination review process; 2) establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and 3) report periodically to Office of Management and Budget on the number and nature of complaints received.

Scientific information and data are key components of fishery management plans (FMPs) and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Act, FMPs and amendments must be based on the best information available. They should also properly reference all supporting materials and data, and be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data will also undergo quality control prior to being used by the agency and a pre-dissemination review.

Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended, (16 U.S.C. Section 1531 et seq.) requires federal agencies use their authorities to conserve endangered and threatened species. The ESA requires NMFS, when proposing a fishery action that "may affect" critical habitat or endangered or threatened species, to consult with the appropriate administrative agency (itself for most marine species, the U.S. Fish and Wildlife Service for all remaining species) to determine the potential impacts of the proposed action. Consultations are concluded informally when proposed actions may affect but are "not likely to adversely affect" endangered or threatened species or designated critical habitat. Formal consultations, including a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" endangered or threatened species or adversely modify designated critical habitat. If jeopardy or adverse modification is found, the consulting agency is required to suggest reasonable and prudent alternatives.

On September 30, 2011, the Protected Resources Division released a biological opinion which, after analyzing best available data, the current status of the species, environmental baseline (including the impacts of the recent Deep-water Horizon MC 252 oil release event in the northern Gulf of Mexico), effects of the proposed action, and cumulative effects, concluded that the continued operation of the Gulf of Mexico reef fish fishery is also not likely to jeopardize the continued existence of green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles, nor the continued existence of smalltooth sawfish (NMFS 2011). On December 7, 2012, NMFS published a proposed rule to list 66 coral species under the ESA and reclassify *Acropora* from threatened to endangered (77 FR 73220). In a memorandum dated February 13, 2013, NMFS determined the reef fish fishery was not likely to adversely affect *Acropora* because of where the fishery operates, the types of gear used in the fishery, and that other regulations protect *Acropora* where they are most likely to occur. In a consultation memorandum dated October 7, 2014, NMFS assessed the continued operation of the Gulf reef fish fishery's potential impact on the four newly-listed coral species occurring in the Gulf and concluded the fishery is not likely to adversely affect any of the protected coral species. Similarly, in a consultation memorandum dated September 16, 2014, NMFS assessed the continued authorization of South Atlantic and Gulf of Mexico fisheries' potential impacts on loggerhead critical habitat and concluded the Gulf reef fish fishery is not likely to adversely affect the newly designated critical habitat.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas, and on the importing of marine mammals and marine mammal products into the United States. Under the MMPA, the Secretary of Commerce (authority delegated to NMFS) is responsible for the conservation and management of cetaceans and pinnipeds (other than walruses). The Secretary of the Interior is responsible for walruses, sea and marine otters, polar bears, manatees, and dugongs.

Part of the responsibility that NMFS has under the MMPA involves monitoring populations of marine mammals to make sure that they stay at optimum levels. If a population falls below its optimum level, it is designated as "depleted," and a conservation plan is developed to guide research and management actions to restore the population to healthy levels.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction, development and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries, and studies of pinniped-fishery interactions.

Under Section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that places all U.S. commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occurs in each fishery. The categorization of a fishery in the List of Fisheries determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The primary gears used in the Gulf of Mexico reef fish fishery are still classified in the proposed 2014 MMPA List of Fisheries as Category III fishery (December 6, 2013; 78 FR 73477).

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure the public is not overburdened with information requests, the federal government's information collection procedures are efficient, and federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NMFS to obtain approval from the Office of Management and Budget before requesting most types of fishery information from the public. This action would likely not have PRA consequences.

Executive Orders

E.O. 12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights that became effective March 18, 1988, requires each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. The National Oceanic and Atmospheric Administration Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

E.O. 12866: Regulatory Planning and Review

Executive Order 12866: Regulatory Planning and Review, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NMFS prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that either implement a new fishery management plan or significantly amend an existing plan (See Chapter 5). RIRs provide a comprehensive analysis of the costs and benefits to society of proposed regulatory actions, the problems and policy objectives prompting the regulatory proposals, and the major alternatives that could be used to solve the problems. The reviews also serve as the basis for the agency's determinations as to whether proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Analysis. A regulation is significant if it a) has an annual effect on the economy of $100 million or more or adversely affects in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments and communities; b) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency; c) materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or d) raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

E.O. 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

This Executive Order mandates that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. The Executive Order is described in more detail relative to these actions in Section 3.5.

E.O. 12962: Recreational Fisheries

This Executive Order requires federal agencies, in cooperation with states and tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods including, but not limited to, developing joint partnerships; promoting the restoration of recreational fishing areas that are limited by water quality and habitat degradation; fostering sound aquatic conservation and restoration endeavors; and evaluating the effects of federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects. Additionally, it establishes a seven-member National Recreational Fisheries Coordination Council (Council) responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

E.O. 13132: Federalism

The Executive Order on Federalism requires agencies in formulating and implementing policies, to be guided by the fundamental Federalism principles. The Order serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendments given the overlapping authorities of NMFS, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes, and local entities.

E.O. 13158: Marine Protected Areas

This Executive Order requires federal agencies to consider whether their proposed action(s) will affect any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resource within the protected area. There are several marine protected areas, habitat areas of particular concern, and gear-restricted areas in the eastern and northwestern Gulf of Mexico.

Essential Fish Habitat

The amended Magnuson-Stevens Act included a new habitat conservation provision known as essential fish habitat (EFH) that requires each existing and any new FMPs to describe and identify EFH for each federally managed species, minimize to the extent practicable impacts from fishing activities on EFH that are more than minimal and not temporary in nature, and identify other actions to encourage the conservation and enhancement of that EFH. To address these requirements the Council has, under separate action, approved an Environmental Impact Statement (GMFMC 2004) to address the new EFH requirements contained within the Magnuson-Stevens Act. Section 305(b)(2) requires federal agencies to obtain a consultation for any action that may adversely affect EFH. An EFH consultation will be conducted for this action.

References

GMFMC. 2004. Final environmental impact statement for the generic essential fish habitat amendment to the following fishery management plans of the Gulf of Mexico: shrimp fishery of the Gulf of Mexico, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, stone crab fishery of the Gulf of Mexico, coral and coral reef fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South Atlantic, coastal migratory pelagic resources of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council. Tampa, Florida. http://www.gulfcouncil.org/Beta/GMFMCWeb/downloads/Final%20EFH%20EIS.pdf

NMFS. 2011. Biological opinion on the continued authorization of Reef Fish fishing under the Gulf of Mexico Reef Fish Fishery Management Plan. September 30, 2011. Available at: http://sero.nmfs.noaa.gov/pr/esa/Fishery%20Biops/03584%20GOM%20Reef%20Fish%20BiOp%202011%20final.pdf

APPENDIX D. UNIQUE NUMBER OF VESSELS FISHING WITHIN THE AREA IN EACH ALTERNATIVE

Appendix D. Tables a-d. Number of unique vessels per area, per year, per gear type within the proposed HAPC boundaries in Action 1. Grayed squares indicate when data was unavailable. ELB indicates information from shrimp electronic logbooks (ELB). VMS is the sum of all vessel monitoring system (VMS) gear types, further divided into specific gear types (as appropriate). As described in Section 1.1 regarding the data limitations, except for the ELB data, having a permit holder recorded in the area does not conclusively prove they were actively fishing or what gear they were fishing with.

Action 1

a. Action 1, Alternative 1 Pulley Ridge South

Year	ELB	VMS	bottom longline	bandit rig	spear
2004	0				
2005	0				
2006	0				
2007	0	2	2	0	0
2008	0	11	9	2	0
2009	0	10	8	0	0
2010	0	15	10	5	0
2011	0	20	14	6	0
2012	0	14	6	8	0
2013	0	17	9	7	1
2014		26	20	5	1
2015		18	13	5	0

b. Action 1, Alternative 2 Pulley Ridge North

Year	ELB	VMS	bottom longline	crab trap	bandit rig	spear
2004	1					
2005	1					
2006	1					
2007	0	7	5	0	2	0
2008	2	38	23	0	15	0
2009	1	45	25	0	20	0
2010	0	36	22	0	14	0
2011	2	44	24	1	19	0
2012	0	47	21	0	26	0
2013	0	47	25	0	21	1
2014		52	32	1	18	1
2015		42	28	0	14	0

c. Action 1 Alternative 3 Pulley Ridge South Expanded

Year	ELB	VMS	bottom longline	bandit rig	spear
2004	0				
2005	0				
2006	0				
2007	0	4	3	1	0
2008	0	16	10	6	0

Year	ELB	VMS	bottom longline	bandit rig	spear
2009	1	18	10	8	0
2010	0	18	12	6	0
2011	0	27	15	12	0
2012	0	25	11	14	0
2013	0	21	11	9	1
2014		28	20	7	1
2015		20	15	5	0

d. Action 1, Preferred Alternative 4 Pulley Ridge South Portion A Only

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	4	3	1
2008	0	14	8	6
2009	1	16	8	8
2010	0	18	12	6
2011	0	24	13	11
2012	0	25	11	14
2013	0	18	10	8
2014		23	18	5
2015		16	12	4

Appendix D Tables e-h. Number of unique vessels per area, per year, per gear type within the proposed HAPC boundaries in Action 2. Grayed squares indicate when data was unavailable. ELB indicates information from shrimp ELBs. VMS is the sum of all VMS gear types, further divided into specific gear types (as appropriate). As described in Section 1.1 regarding the data limitations, except for the ELB data, having a permit holder recorded in the area does not conclusively prove they were actively fishing or what gear they were fishing with.

Action 2

e. Action 2, Alternative 2 Long Mound

year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	2	2	0
2010	0	0	0	0
2011	0	2	1	1
2012	0	1	1	0
2013	0	0	0	0
2014		0	0	0
2015		0	0	0

f. Action 2, Alternative 3 Many Mounds

year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	4	3	1
2010	0	0	0	0
2011	0	2	2	0
2012	0	1	1	0
2013	0	1	1	0
2014		0	0	0
2015		1	0	1

g. Action 2, Alternative 4 North Reed

year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	1	1	0
2010	0	0	0	0
2011	0	2	1	1
2012	0	0	0	0
2013	0	0	0	0
2014		1	1	0
2015		0	0	0

h. Action 2, Alternative 5 West Florida Wall

year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	1	1	0
2010	0	0	0	0
2011	0	3	2	1
2012	0	2	2	0
2013	0	0	0	0
2014		0	0	0
2015			0	1

Appendix D Tables i-n. Number of unique vessels per area, per year, per gear type within the proposed HAPC boundaries of Action 3. Grayed squares indicate when data was unavailable. ELB indicates information from shrimp ELBs. VMS is the sum of all VMS gear types, further divided into specific gear types (as appropriate). As described in Section 1.1 regarding the data limitations, except for the ELB data, having a permit holder recorded in the area does not conclusively prove they were actively fishing or what gear they were fishing with.

Action 3

i. Action 3, Alternative 2 Alabama Alps

Year	ELB	VMS	bottom longline	trawl net	trap
2004	0				
2005	0				
2006	0				
2007	1	1	0	0	1
2008	1	11	1	1	9
2009	0	21	1	1	19
2010	1	15	1	1	13
2011	1	12	1	1	10
2012	1	15	3	0	12
2013	1	11	1	0	10
2014		18	0	0	18
2015		8	0	0	8

j. Action 3, Alternative 3 L&W Pinnacles and Scamp Reef

Year	ELB	VMS	bottom longline	shrimp trap	trap	bandit rig
2004	0					
2005	0					
2006	0					
2007	0	1	0	0	0	1
2008	0	20	2	0	1	17
2009	0	41	6	0	1	34
2010	1	28	4	0	0	24
2011	0	33	3	0	0	30
2012	0	36	5	1	0	30
2013	0	28	4	0	0	24
2014		35	2	0	0	33
2015		23	2	0	0	21

k. Action 3, Alternative 4 Mississippi Canyon 118

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	1	0	1
2010	6	1	0	1

Year	ELB	VMS	bottom longline	bandit rig
2011	0	2	1	1
2012	0	2	1	1
2013	0	3	3	0
2014		1	1	0
2015		0	0	0

l. Action 3, Alternative 5 Roughtongue Reef

Year	ELB	VMS	bottom longline	shrimp trap	trap	bandit rig
2004	0					
2005	0					
2006	0					
2007	0	1	0	0	0	1
2008	0	26	3	0	1	22
2009	0	29	5	0	1	33
2010	0	24	1	0	0	23
2011	2	32	2	0	0	30
2012	0	33	4	1	0	28
2013	0	34	5	0	0	29
2014		32	2	0	0	30
2015		22	2	0	0	20

m. Action 3, Alternative 6 Viosca Knoll 826

Year	ELB	VMS	bottom longline	bandit rig	spear
2004	0				
2005	0				
2006	0				
2007	0	0	0	0	0
2008	0	0	0	0	0
2009	0	1	0	1	0
2010	3	0	0	0	0
2011	0	2	0	2	0
2012	0	4	2	1	1
2013	0	3	1	2	0
2014		2	0	2	0
2015		0	0	0	0

n. Action 3, Alternative 7 Viosca Knoll 862/906

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	1			
2007	2	0	0	0
2008	4	2	0	2
2009	2	6	2	4
2010	6	6	2	4
2011	1	3	2	1
2012	1	5	2	3
2013	1	6	4	2
2014		3	1	2
2015		4	1	3

Appendix D Tables o-q. Number of unique vessels per area, per year, per gear type within the proposed HAPC boundaries of Action 4. Grayed squares indicate when data was unavailable. ELB indicates information from shrimp ELBs. VMS is the sum of all VMS gear types, further divided into specific gear types (as appropriate). As described in Section 1.1 regarding the data limitations, except for the ELB data, having a permit holder recorded in the area does not conclusively prove they were actively fishing or what gear they were fishing with.

Action 4

o. Action 4, Alternative 2 AT047

year	ELB	VMS	bottom longline
2004	0		
2005	0		
2006	2		
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	0	1	1
2012	0	0	0
2013	0	0	0
2014		1	1
2015		0	0

year	ELB	VMS	bottom longline
2004	0		
2005	1		
2006	0		
2007	0	0	0
2008	0	0	0
2009	0	1	1
2010	0	0	0
2011	0	0	0
2012	0	1	1
2013	0	0	0
2014		0	0
2015		0	0

q. Action 4, Alternative 4, Green Canyon 852

p. Action 4, Alternative 3 AT357

Year	ELB
2004	0
2005	1
2006	0
2007	0
2008	0
2009	0
2010	0
2011	0
2012	0
2013	0
2014	
2015	

Appendix D Tables r-s. Number of unique vessels per area, per year, per gear type within the proposed HAPC boundaries of Action 5. Grayed squares indicate when data was unavailable. ELB indicates information from shrimp ELBs. VMS is the sum of all VMS gear types, further divided into specific gear types (as appropriate). As described in Section 1.1 regarding the data limitations, except for the ELB data, having a permit holder recorded in the area does not conclusively prove they were actively fishing or what gear they were fishing with.

Action 5

r. Action 5, Alternative 2, Harte Bank

year	ELB	VMS	bottom longline	trawl net	bandit rig
2004	0				
2005	1				
2006	1				
2007	1	0	0	0	0
2008	0	1	0	1	0
2009	0	4	1	1	2
2010	0	2	1	1	0
2011	0	3	0	1	2
2012	1	2	1	0	1
2013	0	3	1	1	1
2014		2	0	0	2
2015		1	1	0	0

s. Action 5, Alternative 3, Southern Bank

Year	ELB	VMS	bandit rig
2004	0		
2005	0		
2006	0		
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	2	0	0
2012	0	0	0
2013	0	1	1
2014		0	0
2015		0	0

Appendix D Tables t-aa. Number of unique vessels per area, per year, per gear type within the proposed HAPC boundaries of Action 6. Grayed squares indicate when data was unavailable. ELB indicates information from shrimp ELBs. VMS is the sum of all VMS gear types, further divided into specific gear types (as appropriate). As described in Section 1.1 regarding the data limitations, except for the ELB data, having a permit holder recorded in the area does not conclusively prove they were actively fishing or what gear they were fishing with.

Action 6

t. Action 6, Alternative 2, South Reed

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	1	0	1
2012	0	0	0	0
2013	0	2	1	1
2014		0	0	0
2015		0	0	0

u. Action 6, Alternative 3, Garden Bank 299

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	1			
2006	0			
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	1	1	0
2011	0	0	0	0
2012	0	2	1	1
2013	0	0	0	0
2014		0	0	0
2015		0	0	0

v. Action 6, Alternative 4, Garden Bank 535
No points via ELB or VMS recorded.

w. Action 6, Alternative 5, Green Canyon 140 and 272

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	0			
2006	1			
2007	0	0	0	0
2008	1	2	1	1
2009	0	4	1	3
2010	0	3	2	1
2011	0	5	2	3
2012	0	5	2	3
2013	0	5	2	3
2014		4	1	3
2015		2	1	1

x. Action 6, Alternative 6, Green Canyon 234

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	1			
2006	1			
2007	0	0	0	0
2008	0	0	0	0
2009	1	1	1	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014		1	0	1
2015		1	1	0

y. Action 6, Alternative 7 Green Canyon 354
No points via ELB or VMS recorded.

z. Action 6, Alternative 8, Mississippi Canyon 751

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	1			
2006	1			
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	1	1	0
2011	0	1	1	0
2012	0	0	0	0
2013	0	0	0	0
2014		1	0	1
2015		0	0	0

Year	ELB	VMS	bottom longline	bandit rig
2004	0			
2005	2			
2006	2			
2007	0	0	0	0
2008	0	0	0	0
2009	0	2	1	1
2010	0	1	1	0
2011	0	0	0	0
2012	0	1	1	0
2013	0	0	0	0
2014		0	0	0
2015		0	0	0

aa. Action 6, Alternative 9, Mississippi Canyon 885

APPENDIX E. SUMMARY OF PUBLIC SCOPING & COMMENT

This section provides summaries of the comments received pertaining to Coral Amendment 9:

I. Summary of scoping workshop comments conducted from February 19, 2017 through March 20, 2017.
II. Summary of scoping comments received by NOAA Fisheries on the Notice of Intent to prepare an environmental impact statement (EIS).
III. Summary of written public comments received by April 2018 through June 2018.
IV. Summary of public hearings, conducted during May, 2018 through June 2018.
V. Comment letter on the draft environmental impact statement (DEIS) from the Environmental Protection Agency (EPA).
VI. Response to comments from the EPA on the DEIS for Amendment 9.
VII. Response to comments from the public on the DEIS for Amendment 9.

I. Summary of scoping workshop comments conducted from February 19, 2017 through March 20, 2017.

Brownsville, Texas
February 19, 2017

<u>Council/Staff</u>
Greg Stunz
Emily Muehlstein
Camilla Shireman

6 members of the public attended.
1 member of the public spoke.

- The Shrimp Advisory Panel met with the coral scientists to discuss these potential closed areas. A lot of people were concerned with how that meeting would work out because having coral biologists and shrimpers in the same room could have been contentious, but the meeting went really well.
- There are electronic logbooks on the shrimp vessels and initially, there was skepticism about giving data on shrimping locations, but this is the 3rd time the effort data has been used to the advantage of the shrimpers. In the two proposed closures off of Texas there is no shrimping effort. The boats are already avoiding these areas, so there is no bottom being given up with the closure of the Harte bank and the southern bank. Gary was most concerned with an area in the Flower Gardens expansion that was inshore and possessed shrimping effort. It's only about a mile or so, but it's very productive shrimping ground. When you're looking at the electronic log book data and you see areas with not effort, however, once in a while you'll see a dot or two indicating that they might be dragging, he wants to warn that those vessels may not be dragging,

they may be having some difficulty rather than shrimping. Enforcement should not be based solely on ELB data for this reason.

Galveston, Texas
February 21, 2017

<u>Council/Staff</u>
Doug Boyd
Emily Muehlstein
Camilla Shireman

4 members of the public attended.
4 members of the public spoke.

- The Gulf Council should reincorporate octocorals into the Fishery Management Unit. Octocoral management was given to the State of
- Florida because the fishery is in Florida, however, the Council should have jurisdiction over octocorals because they are an integrated component of the habitat. They are important for more than harvest purposes.

- The state of Florida shouldn't manage the corals across the Gulf of Mexico.

- The deep water protections should be supported. The correlation between habitat and healthy fisheries is very important and it's a key part of managing the fisheries.

- Anchoring should not be allowed in the proposed areas.

- A lot of these areas aren't being fished, but the rapid decline of the corals on a global scale should prod the Council into action.

- The proposed areas that have been fished, have historically been fished by commercial fishermen. Fishing effort in these areas is a lot less now than it was historically because new technology in electronics ensures that fishermen avoid these areas so they don't lose gear. There must be a way to protect the corals without harming the fishermen's historical use of the areas.

- Reversing damage to these corals is difficult. These corals are thousands of years old and if they become overfished it would be impossible to conceive of a rebuilding plan for such a long lived species.

- If the Council is trying to preemptively protect these corals, he wonders if there is a way to limit new exploitation rather than limit the current participation in the fishery.

- There is concern that if the Council reincorporates octocorals into fishery management units, the corals will be subject to the same overfishing/overfished limitations as our finfish species. If so, this may open the doorway to create punitive measures for an overfished coral species that are experiencing overfishing to no fault of the fishing activity.

- If there are prohibitions on fishing activity there should be targeted outreach effort to help historical fishermen understand the areas and the new regulations.

- All 47 are important and, arguably, in need of protection but these 15 are the crème de la crème.

- The Flower Garden Banks National Marine Sanctuary used the existing HAPC boundaries in their expansion and they're currently looking at modifying the boundaries. The Council should work in concert with the Sanctuary if it plans to redefine the current boundaries.

Key West, Florida
February 21, 2017

<u>Council/Staff</u>
John Sanchez
Doug Gregory
Bryan Schoonard

7 members of the public attended.
0 members of the public spoke.

Madeira Beach, FL
February 23, 2017

<u>Council/Staff:</u>
Tom Frazer
Morgan Kilgour
Bryan Schoonard
Claire Roberts

15 Members of the public attended
7 Members of the public commented

- Many vessel owners were unable to attend and testify at this meeting because they were out fishing.

- There is concern on expanding Pulley Ridge. These are historical fishing grounds and closure would have serious economic impacts on the fleet and infrastructure. Why does this area need to be expanded? The data says that this is a pristine area, and given that, the industry should be commended as it has been fishing in that area for years. The industry is regulated enough. There are area closures, closed seasons, turtle regulations and gear closures to name a few.

- Pulley Ridge extension and the recommended sites off the West Florida Shelf are where long-liners fish all summer. Closing those two areas would push fishermen to the north and the West Florida Shelf fishermen to the south, concentrating all that effort on the area between those two closure zones, effectively eliminating their summer season.

- Regarding Pulley Ridge, the current closed area is the ridge and to the west of the area is only flat bottom. The only thing being pulled up west of the closed area is ‘cabbage’ (seaweed) so there doesn’t need to be an expansion.

- Research conducted by Harbour Branch and NOAA says that the Pulley Ridge extension area has the highest concentration of coral cover that the researchers have seen to date. This area has been heavily fished but still has extensive coral cover.

- The Council/NOAA are building a funding mechanism by drawing an inaccurate box to close an area, so that when fishermen accidentally have gear move into one of these boxes because of the prevailing current, they are given a $11k-$30k fine.

- Why should a penalty box should exist when the fishermen aren’t hurting anything? Fishermen knew they were damaging essential fish habitat, so why would Council want to close an area when fishermen want to continue to have access to those fish. The Council should be determining what they are trying to protect these corals from, and create regulations that accomplish that goal rather than just creating blanket regulations.

- It is important to evaluate the effectiveness of closed areas.

- Longliners have been fishing these areas their whole lives, and despite the minimal damage they’ve caused, various areas keep getting shut down and regulated. If areas keep getting closed, new fishermen won’t be able to make a living.

- Why is the Council trying to protect the western expansion of Pulley Ridge if it’s already in pristine condition?

- The sites on the West Florida Shelf are historical fishing grounds. There might be some gear out there but it’s from the early ‘80s. The fishermen are taking care of these sites because if they fished the sites wrong, they would lose their gear which hurts the environment and themselves. Either guys don’t mess with fishing the areas because they can’t fish them properly or those who do are professional enough to do it properly.

- Fishermen are being regulated out of the industry.

- Fishermen are aware of where most of the coral exists, but aren’t inclined to share that information with scientists for fear of more areas being closed off.

- Fishermen do no damage to the bottom, especially compared to the lobster pots that used to be allowed in that area.

Houma, LA
March 6, 2017

Council/Staff:
Myron Fischer
Morgan Kilgour
Bryan Schoonard

25 Members of the public attended.
0 Members of the public commented.

Gulfport, MS
March 7, 2017

Council/Staff:
Traci Floyd- DMR representative
Morgan Kilgour
Bryan Schoonard

15 Members of the public attended.
0 Members of the public commented.

Mobile, AL
March 8, 2017

Council/Staff:
Johnny Greene
Morgan Kilgour
Bryan Schoonard

10 Members of the public attended
3 Members of law enforcement attended
5 Members of the public commented

- Fishing rights should not be taken away in areas where corals are not present. The prohibition to bottom tending gear makes sense in areas with coral, but more and more restrictions will likely be placed on these areas. There should be a guarantee to protect his rights to fish as long as he doesn't harm the coral.

- There is concern with expanding on these areas indefinitely. In the South Atlantic, they lost a lot of rock shrimp bottom. The South Atlantic took a designated area and ran it bigger and bigger with buffers. What is the guarantee that these coral areas are not going to grow inside of 50 fathoms where they conduct their fisheries?

• Last year, 60% of his boats had observers on board. They are not catching corals, and there are no records showing that they are catching corals. The advisory board should review all of the records to see if they have ever caught coral on those boats.

• There is concern for the future of the fishery as management closes all bottom, and therefore, closes the rock shrimp fishery. The east coast rock shrimp fishery would equate to about 5% of shrimp production on his boat; the Gulf coast shrimp is much higher. Analysis should be conducted on the value of the closed areas on the east coast over the course of the years.

• These areas should be monitored to make sure that the closed areas are still necessary and have corals.

• There is concern that once coral areas gets started, they will expand like a cancer and drive everyone out.

• There is concern with the proximity of the boundaries in the northern Gulf to the 50 fathom line and for royal red shrimping grounds. No one that is from the shrimp fishery is targeting these areas.

• Analysis in Coral Amendment 7 should include the historical data on the progression of the closed areas in the South Atlantic and how those have changed over time.

Panama City, FL
March 9, 2017

Council/Staff:
Pam Dana
Morgan Kilgour
Bryan Schoonard

1 member of the public attended.
0 members of the public commented.

Webinar
March 20, 2017

<u>Council/Staff:</u>
Emily Muehlstein
Bernadine Roy

6 members of the public attended.
0 member of the public commented.

Summary of Written Comments Received
March 29, 2017

15 members of the public submitted comment.

- The Council should establish strong protections for deep water corals and essential fish habitat because deep water corals are a national treasure essential to a sustainable, healthy Gulf.
- We lose too many of these fragile deep water corals so, damaging fishing practices should be restricted in those areas.
- Protecting coral will benefit fishermen in the long run.
- Deep water corals are sensitive and take years to recover from damage. Policies should safeguard these fragile areas by prohibiting anchoring or the use of deep-fishing gear.
- Coral reefs should be protected to allow for continued enjoyment of the ecosystem.
- Designating new Habitat Areas of Particular Concern will lessen human impact on coral growth. The Council should focus on protecting corals that are impacted most by human activates.
- Limiting commercial fishing can improve the ecosystems and allow fish and invertebrates to thrive.
- Reincorporating octocorals into the Fisheries Management Unit would benefit the ecosystem.
- The Gulf Council should move forward by restricting the use of bottom trawls, bottom longlines, dredges, traps, pots, bottom-set nets, and fixed longlines in the 15 identified areas.
- The 8 additional HAPC's suggested in the document should include consideration of fishing regulations.
- More HAPC's should be created with specific attention paid to bottom trawling.
- Existing HAPC's should be redefined using new research technology and information that wasn't available when designation was made initially.
- The draft scoping document does not offer an adequate number of options for consideration. The document should include a "no action" alternative and the creation of "deep-sea coral zones" as specified under §303(b)(2) of the Magnuson-Stevens Act.
- To avoid unnecessary confusion or potential conflicts with other regulatory agencies, the Council should consider how the proposed actions integrate or overlap with existing regulations of other federal agencies.

- The scoping document lacks economic analysis that would ensure the balance of all concerns related to the Gulf.
- The document should include an alternative that manages deep sea corals using the discretional deep sea coral authority described in NOAA's 2017 Strategic Plan.
- Amendment 7 should include a pathway for areas to be considered and managed if and when new science becomes available.
- The amendment should be organized to group sites by depth and geographic region. The Council's corals expert working group divided the Gulf into three depth zones (50-200m, 200-1000 m, >1000m or 164-656 ft., 656-3,280 ft., > 3,280 ft.), and by geographical regions (Florida, Northeast, Northwest, and South Texas).
- A separate action should be included to address the very deep coral sites (e.g., > 1000m or 3,280 ft.) predominantly in the northeastern and northwestern regions, where little occurs. This approach both corresponds with the distinct physical and biological characteristics of the various coral communities, and may make it easier for stakeholders to assess and comment on potential impacts.
- The Council should work with the state of Florida to reinstate deep-water octocorals in the Coral Fishery Management Plan to protect them in federal waters.
- The sites identified by the Council's corals expert work group that do not ultimately get included in the Flower Garden Banks National Marine Sanctuary (FGBNMS) expansion should be included in this amendment.

II. Summary of scoping comments received by NOAA Fisheries on the Notice of Intent to prepare an environmental impact statement (EIS)

The comment period was open from December 18, 2017, through January 17, 2019, and seven comments were received. These comments may be reviewed at www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2017-0146.

There were three comments in support of the establishment of the habitat areas of particular concern (HAPC), two were against, and two were not relevant to the Amendment. Comments in support of establishing HAPCs cited the importance protecting deeps sea coral areas, recommended establishing additional areas as HAPCs, and incorporating recommendations from the Council's Scientific and Statistical Committee from the January 2018 meeting. Comments against establishing HAPCs included concerns that the additional designation would negatively impact the oil and gas industry, the establishing HAPCs take away more fishing grounds, and a recommendation to allow fishermen to vote on this issue.

III. Summary of written public comments received by the Council from April 2018 through June 2018.

A total of 1665 written comments were received by the Council between 4/3/18 – 6/13/18.

<u>Action 1</u>

- Support for preferred Alternative 4
- Support for Alternative 2 to ensure that the entire area is protected from future exploitation.

Action 2

- Alternative 4 makes a good compromise. However, there is concern that the coral "seed source" will be diminished by allowing bottom longlines in adjacent areas so, Alternative 5 might be most appropriate.
- Support for Preferred Alternative 5, option b – The west Florida shelf should be protected.
    - Bottom gear should be prohibited in the west Florida shelf while fishing grounds in non-coral areas should be maintained.
    - Trolling should still be permitted in the area.
    - Bottom longlining should be prohibited in the area.
    - Fishing gear should be kept away from the important coral areas
- Patch reefs have relationships to one another, so it's good to protect the entire west Florida wall.

Action 3

- Support for preferred Alternatives 2, 3, 4, 5, 6, and 7, option b.

Action 4

- Support for preferred Alternatives 2, 3, and 4, option b.

Action 5

- Support for preferred Alternatives 2 and 3, option a.
- Support for Alternatives 2 and 3, option b. Harte Bank and Southern Bank should both have fishing regulations. These are known coral areas. The Southern Bank boundaries have already been reduced and the Harte Bank shows little evidence of fishing, so adding fishing regulations will allow for more protections without conflict to fishermen.

Action 6

- The areas considered in this action should have fishing regulations to protect them from potential future exploitation.
- Add fishing regulations now because new fisheries emerge faster than regulations can be put into place.
- Support for preferred Alternatives 2, 3, 4, 5, 6, 7, 8, and 9.

Action 7

- Support for preferred Alternative 2. Even if bottom dredging is not currently being used, it makes good sense to consider future protection and conservation of coral found in these areas.

General Support for the Amendment

- Designating the areas as HAPCs is fully appropriate according to the Council's authority and responsibility under the Magnuson-Stevens Act.
- The consultation requirement associated with designation ensures the Council will have a role in reviewing and commenting on activity authorized, funded, or undertaken by any federal or state agency that could adversely affect EFH and allows the Council to recommend measures to avoid, mitigate, or offset impacts.
- The Magnuson-Stevens Act requires the Council to designate EFH, minimize harmful fishing impacts on EFH, and actively protect and enhance EFH.
- The 1996 Sustainable Fisheries Act encourages the Council to take a proactive approach to limiting gear types that may harm fisheries or essential fish habitat.

- The 15 new HAPCs should have associated regulations that prohibit fishing related activities that damage corals.
- The use of bottom tending gear should be restricted in all 23 sites being considered.
- Protections should be expanded to all of the 23 sites in the document.
- Include regulations on fishing gear that interact with the ocean floor and could damage fragile corals at all 23 sites being considered.
- Protect corals now rather than waiting for evidence of destruction before acting.
- Bottom tending gear should be restricted in all HAPCs.
- This amendment would still allow historical levels of fishing for valuable commercial species while protecting deep-sea coral communities.
- Corals need to be protected from the oil and gas industry.
- Protect corals from fishing related damage.
    - Damage to deep sea corals due to bottom contacting gear is well documented.
    - Bottom trawls are particularly damaging to corals, so their use around coral areas should be minimized.
    - Trawling gear should be banned outright.
    - Longlines should not be allowed.
    - All gear that interacts with the ocean floor and could damage corals should be banned.
    - We should be able to come up with more sophisticated, less damaging gear that allows us to fish without harming corals.
    - Damage from fishing gear leaves coral areas vulnerable to disease.
    - Fishing practices damage all sorts of corals and sea fans.
    - Bycatch from commercial fishing is devastating.
- The Council should consider whether allowing historic levels of fishing is possible without risking the collapse of fish populations and the habitats on which they depend.
- Octocorals should be incorporated into the fishery management unit of the Fishery Management Plan for coral.
- Wildlife and global biodiversity should be protected.
- Damage to corals needs to be prevented because:
    - They're so fragile.
    - They take such a long time to recover.
    - Little is known about the ecosystem, so it should be protected.
    - Corals have thrived for centuries but are now threated by man's interference.
    - Corals are an integral part of the ecosystem.
    - They provide feeding and breeding groups for numerous species.
    - They are the basis of life in the oceans and destroying corals will destroy human life.
    - All ecosystems are related and coral death will impact the food-chain.
    - We need to maintain the vitality of our oceans.
    - These ancient and beautiful organisms should be honored for future generations.
    - Healthy fisheries and oceans drive the success of Gulf coastal economies.
    - Researchers are just beginning to realize the potential for deep-water corals to solve human medical issues, such as cancer.

    - Deep water sponges provide antibiotics, cancer drugs, bone grafts, and dental implants. Sea Fans contain powerful anti-inflammatory chemicals. Soft corals have anti-viral properties. It’s important to protect them for future utility.
    - Corals provide complex and diverse habitat for a variety of marine life including economically important species.
    - Rising ocean temperatures and pollution are already taking their toll, so we need to do what we can to protect coral.
    - Corals offer nursery grounds, protection from predators, and contribute to the reproduction and feeding of many species.
    - Corals act as the “canary in the coal mine” and their health is indicative of the wellbeing of the entire system.
    - Ocean acidification is already causing corals to die.
    - Ocean plastics are already killing corals so we need to save them when we can.
    - Coral reefs are endangered.
    - Deep corals play a critical role in seeding the growth of shallow water corals.
    - Corals provide refuge for crustaceans.
    - Healthy corals are habitat for fish and provide more fishing opportunities.
- Protecting corals would be the most significant action ever taken by the Council to safeguard fragile corals.
- We are destroying our environment for commercial, for-profit reasons and through recreational carelessness.
- Ultimately, fishermen will benefit from protected corals because they’ll encourage healthy fisheries.
- As the ocean waters warm, fish will move deeper and so will fishermen, it’s important to protect the corals preemptively.
- All corals are in danger so we need to protect what we have.
- Amendment 9 is a good start, but we need to do even more to protect our corals.
- Do what you can to protect corals because there are so many other threats including oil spills, chemicals, acidification, mining, a rise in ocean temperatures.
- The Mid-Atlantic Council has protected corals, so the Gulf ought to do the same.
- We’re already losing species we don’t know about because of oil drilling and spilling.
- Protecting corals is a long-term way to protect our Gulf and its fisheries, while allowing degradation from fishing practices is short sighted.
- Killing corals with fishing gear is no different than clear cutting old growth forest like California’s Sequoia National Park. The Sherwood Forest in Nottinghamshire was leveled to allow hunting for a few deer.

<u>General Opposition to the Amendment</u>

- No New HAPCs should be established
- No new gear restrictions should be made
- The Gulf of Mexico is a vital environmental resource for the nation and a critical economic engine.

- Descriptions of the areas being considered for HAPC status should not be qualitative and areas should not be considered for such status without explicit scientific evidence that each area meets the criteria for HAPC designations defined in 50CFR600.815.(a)(8).
- The Council should include alternatives beyond the two choices of “no action” or identification of HAPC when considering action for deep sea coral zone designations.
- A comprehensive cost-benefit analysis for all potentially impacted industry should be included for each alternative.
- The Council should consider and describe how the alternatives integrate and/or overlap with existing regulations of other federal agencies to avoid unnecessary confusion and potentially conflicting regulatory requirements.
- The Council should clearly articulate what the short and long-term management strategies are for coral resources, including how the strategy integrates with other proposed actions by federal agencies.
- Opposition to any area closures to the bottom longline fishery because there is no real evidence of damage to the bottom due to longlines. Scientists even state that they’ve seen rapid new coral growth in areas that are bottom longlined heavily and that coral colonies in Pulley Ridge have declined since it was closed to longlining vessels.

IV. Summary of public hearings, conducted during May, 2018 through June 2018

Brownsville, Texas
May 7, 2018

<u>Council/Staff</u>
Greg Stunz
Morgan Kilgour
Jessica Matos

2 members of the public attended.
1 member of the public spoke.

John Young – Active in Sierra Club and other NGOs
He is concerned with sustainable Gulf shrimping, and doesn’t want the new liquid nitrogen gas development to disrupt it. He was worried about all the threats to the sea such as oil and gas exploration, dead zone, plastics, and dumping of fracking fuel into the Gulf. He called for a last ditch effort to protect whatever can be protected wherever it can be protected. He was supportive of all the preferred alternatives.

Palacios, Texas
May 8, 2018

<u>Council/Staff</u>
Doug Boyd

Morgan Kilgour
Jessica Matos

0 members of the public attended.

League City, Texas
May 9, 2018

Council/Staff
Doug Boyd
Morgan Kilgour
Jessica Matos

17 members of the public attended.
6 members of the public spoke.

Buddy Guindon – Commercial Fisherman, Charter Owner/Operator, Seafood Dealer
There are vessels that have shrimp permits, but use bandit rigs on Harte Bank, so there is the possibility that the area in Harte bank is an area fished with bandit rigs.

Scott Hickman – Commercial Fisherman, Charter Owner/Operator
We need to be less dependent on imported seafood. He wants to protect corals and would like to see evidence that fishing gear is affecting the corals. He does not want to prevent areas from being accessed by fishermen when these areas are pristine. He questions how this will affect the energy industry.

Benny Gallaway – LGL Ecological Associates
Historically there were significant landings of year 2 fish in the shrimp fishery. This has changed dramatically in recent years. The TEDs exclude large fish as effectively as turtles so there are not as many large fish in the catches.

Unknown – Commercial Fisherman
If there is little evidence that there are fishing effects, why prohibit fishing? If the evidence is that there is damage from certain gears, then those specific gears should be prohibited.

Sarah Soflias – Member of the public
There are several regulatory authorities that prevent drilling in sensitive areas. Notice to Lessees provide guidance for how the agency interprets regulations. Does not know of any instance of when an operator would willingly drill in an area that has been designated as a sensitive area.

Shane Cantrell – Charter Owner/Operator, CFA Executive Director
He wonders if the Council is trying to protect these areas from future fisheries development. Unintended consequences need to be thoroughly investigated including effects to fishermen that don't have a VMS or are outside of the reef fish complex.

Webinar
May 22, 2018
<u>Council/Staff</u>
Morgan Kilgour
Bernadine Roy

12 members of the public attended.
2 members of the public spoke.

Eric Brazier – Deputy Director of Gulf of Mexico Reef Fish Shareholders' Alliance
Supports coral protections, but continues to raise concerns with the lack of quantifiable evidence of commercial fishing impacts in these areas. Does not see hard evidence that would warrant such expansive closures.

Jason DeLaCruz – Commercial Fisherman
There is no evidence that the commercial sector is causing any problems to the corals. Echoes Eric's statement.

Key West, FL
June 4, 2018

<u>Council/Staff</u>
John Sanchez
Morgan Kilgour
Camilla Shireman

3 members of the public attended.
2 members of the public spoke.

Alison Johnson – Oceana
Concerned that the HAPCs are a loophole if there is an area of coral that is deemed non-essential fish habitat. Feels that the deep-sea coral provision in the Magnuson-Stevens Act is more appropriate for protecting corals. Would like the Council to add a mechanism to add additional areas and remove areas without corals in the future. Would like the Council to follow the NOAA strategic plan and freeze footprint of fishing and prohibit bottom tending gear in areas until the area has been surveyed and found to not contain corals.

Eric Brazer – Deputy Director of Gulf of Mexico Reef Fish Shareholders' Alliance
He is supportive of evidence based management and understands the value of corals in the ecosystem, but does not see the scientific evidence necessary to support the alternatives. In the case of Pulley Ridge, there has been zero confirmed instances of commercial fishing damaging the corals. HAPCs with regulations don't have the scientific merit to warrant the support in the areas. However, he could support establishing HAPCs with no regulations.

Grand Isle, Louisiana
June 4, 2018

Council/Staff
Patrick Banks
John Froeschke
Karen Hoak

4 members of the public attended.
4 members of the public spoke.

Ashford Rosenberg – Gulf of Mexico Reef Fish Shareholders' Alliance
Supports status quo, stating that Corals are vital to the Gulf ecosystem and need protection. Generally, however, since fishers already fish using coral reef avoidance techniques, placing regulations on these areas at this time is unnecessary. If data starts to show that bottom long-lining gear is impacting these areas, that would be the time to implement these measures.

Steve Tomeny – Charter for-hire
Supports no action for each action in the document. In his business, they fish in shallower waters (about 100 fathoms or less) and they certainly try to avoid any coral since that costs them money in lost gear. Their practice is to anchor in sand then drift over the hard bottom areas to fish, so he did not support implementing regulations that would prohibit anchoring.

Kendall Dix – Gulf Restoration Network (GRN)
Supports restrictions at all 23 sites and a conservation based approach to habitat management. States that there is evidence of habitat damage from snapper grouper fishery in the northern Gulf. He stated that GRN is finding there is a good deal of support in the public arena for protection of coral.

Robert Tabone –
Supports conservation based alternatives in all 23 proposed sites as well, stating the importance of protecting the ecosystem now from the potential for damage in the future. Taking these actions now would reflect wise management and foresight for protection of coral, as well as for businesses that depend on a healthy fishery for their livelihood.

Madeira Beach, Florida
June 5, 2018

Council/Staff
Tom Frazer
Morgan Kilgour
Matt Freeman

13 members of the public attended.

8 members of the public spoke.

Jason DeLaCruz – Commercial Fisherman
The data that has been collected has shown that these areas are still pristine. There hasn't been a clear statement of what corals need protection from. The biggest changes for corals will be from temperature changes, so nothing has been done to protect the corals. Nothing has been done to show that there is damage from fishing gears. There is value in creating an HAPC without fishing regulations. The only goal of establishing HAPCs is to fine someone if fishing gear is prohibited. He likes the idea of exempting bottom longline down in Pulley Ridge. Damage will be done to these corals at a higher level. There is an administration that is backing away from existing environmental protections, and that is what will affect the corals. The rules that are under consideration will fine small businesses and will be problematic.

Bob-Spaeth – Southern Offshore Fishing Association
Concurs with Jason DeLaCruz. Did not hear much in the presentation about the economic problems that this might put on the industry. There is no compelling reason as there is no harm to corals from fishing gear. Allow bottom longlines in the west wall because fishing has traditionally occurred there for many years. The public doesn't have an understanding of all the regulations that affect the fishery, such as turtle regulations. There are few pieces of bottom that can be fished. There are cumulative effects that most of the public don't realize.

Robin Kennedy – Sierra Club
Supports the approval of Coral Amendment 9. Deep-sea corals are fragile. Sponges and corals have medical benefits. It is important to protect these habitats so that this research can continue. These corals face threats from changing oceanic conditions, oil and gas development, and bottom-contact fishing gear. Current policies protect few of these coral areas. Enact the preferred alternatives to protect corals from fishing gear impacts.

Tom Wheatley – Pew Charitable Trusts
The corals have value and there is a need to protect them. Congress has empowered the Councils with the duty to manage and conserve our deep-sea coral and sponge resources which are vital to healthy oceans and productive fisheries. Deep-sea communities have medical benefits, and they should be protected. The Council consulted the most knowledgeable coral experts who identified priority areas that are most susceptible to damage. In Coral 9, HAPCs should include restrictions on fishing gear. He supports the following actions and alternatives:
Action 1- Preferred alternative 4
Action 2- Preferred alternative 5, preferred option b
Action 5- Preferred alternatives 2 and 3, but recommends option b so that the Council is consistent.
Action 6- He supports adding fishing regulations to the HAPCs in the preferred alternatives.
This document represents a significant compromise on protecting corals. The Council's approach to HAPCs leaves the least impact on its fisheries while protecting coral habitat. Pew has received more than 16,000 public comments and will provide them to the Council.

Andrew Muss – Background in reef fish biology
He supports the HAPC concept. From a conservation biology perspective, the Council has a great forum for optimal solutions for resource conflict. Usually, issues are managed when they are in a crisis. This is an opportunity to pre-emptively designate these areas for protection and strengthen the regulatory framework. The biggest bang for your buck is habitat protection. Whenever an area is protected, it has cascading positive effects. Strengthening an ecosystem has benefits to everyone. MPAs act as overflows of productivity and have worked. He supports protecting these areas as much as possible. These areas are slow growing and have a chance of surviving in the future if they're managed properly.

Kenneth Daniels – Bottom longline fisherman
He's been to a few of these areas. These areas aren't torn up, but he wants the fishery to go on for a long time. There's a reason for not finding these areas with fishing gear because it's too sticky to fish it. He agrees with designating these areas as HAPCs, but these areas need protection from things that are actually causing harm, and that's not fishing gear.

Maria Bollinger – Member of the public; her master's thesis was on Southern Bank.
She has seen the biological diversity in the South Texas Banks, and has seen that it is different than the surrounding areas. Designating the areas as HAPCs identifies them as special areas. She recommends adding fishing regulations to Southern Bank. Even though the Council may not have the authority to prevent other harms to corals, giving these areas a designation is helpful for other legislatures in identifying these areas in the future. Fishing activity should be reduced in these areas. Most of the Gulf is mud bottom, which doesn't harm fishing gear. These are oases and refuges for fish species and corals. The proposed HAPCs are all around the Gulf so that fish can move between them. She agrees with most of the preferred alternative, but option b should be selected for the preferred alternatives in Action 5.

Lisa Schmidt – Owns three commercial bottom longline vessels
She is an avid diver and appreciates coral protections. There should be a common ground to make everyone happy. Historically longliners have been fishing in these areas, and there is not proof that they are damaging these areas. This should not be fear based management. This is already a highly regulated industry which makes it difficult to fish. She was concerned these regulations would put people out of business and on welfare. She does not understand the need to add more regulations.

D'Iberville, Mississippi
June 5, 2018

<u>Council/Staff</u>
Dave Donaldson
John Froeschke
Karen Hoak

8 members of the public attended.

8 members of the public spoke.

Robert Wiygul –
Supports expansion of Pulley Ridge with regulations (Action 1, Alternative 2). He also supports fishing regulations in new HAPCs off Texas (Action 5, Alternatives 2b and 3b). He says that it is difficult to implement regulations once fishing has begun in these areas. People's livelihoods are at stake, and he suggests a proactive approach is better.

Melissa Johnson –
Supports protecting biological resources that are slow growing and unlikely to recover from damage in human time scales. She supports implementing conservation-based alternatives ahead of the curve so as to not disrupt people's livelihoods. Supports (Action 5, Alternatives 2b and 3b).

Kendall Dix – Gulf Restoration Network
Supports preferred alternatives and a conservation-based approach to habitat management. States that there is evidence of habitat damage from the snapper grouper fishery in the northern Gulf, citing a NOAA technical memorandum regarding derelict gear. The process should be proactive rather than reactive. These protections would be great for everyone, recreational, commercial, and ecosystem.

Ryan Bradley – Mississippi Commercial Fisheries United
Supports most of the preferred alternatives in the document. Supports science-based studies into these issues rather than decisions being made through emotional reactions. Requests a review of regulations to see if it's acceptable to anchor outside of areas but drift over them to fish. He asked if trawlers would be allowed to retain derelict lobster traps year round. Appreciative that industry was involved in the process to minimize adverse impacts.

John Guglik –
Supports coral protection and alternatives that apply the most conservation measures in HAPCs. He stated that ecosystem effects within HAPCs could benefit and expand the health and populations of species outside of the HAPCs.

Liz Platt –
Supports the most aggressive conservation measures within each action.

Bennet Price –
Supports conservation measures for what we already know about corals, and also stated there may be unknown benefits to protecting corals found through future study and research.

Phillip Wunsch – Environmental engineer and coral enthusiast
Supports coral conservation measures.

Mobile, Alabama
June 6, 2018

<u>Council/Staff</u>
Bob Shipp
John Froeschke
Karen Hoak

9 members of the public attended.
2 members of the public spoke.

Carole Tabay –
Supports Coral Amendment 9 and the preferred alternatives. She would like to see protections in place at all 23 sites considered in the amendment.

Christian Wagley – Gulf Restoration Network
Supports Amendment 9, but would like to see regulations at all 23 sites. NOAA has previously documented damage to deep sea corals, and he referenced a NOAA report by Etnoyer. He supports preferred Alternative 5 in Action 2.

V. Comment letter on the draft environmental impact statement (DEIS) from the Environmental Protection Agency (EPA).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 14 2018

Ms. Lauren Waters
National Marine Fisheries Service (NMFS)
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

Re: EPA Review Comments on Gulf of Mexico Coral Amendment 9 Draft Environmental Impact Statement (DEIS); CEQ #20180102

Dear Ms. Waters:

The U.S. Environmental Protection Agency has reviewed the subject DEIS consistent with Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. The EPA understands that the National Marine Fisheries Service (NMFS) has developed the referenced DEIS to describe and analyze management alternatives to be included in Amendment 9 to the Fishery Management Plan (FMP) for the Coral and Coral Reef Resources of the Gulf of Mexico: Coral Habitat Areas Considered for Management in the Gulf of Mexico (Amendment 9).

Amendment 9 considers alternatives that would modify fishing regulations within the existing 'habitat areas of particular concern' (HAPC) boundary of Pulley Ridge; establish new areas for HAPC status in the Gulf of Mexico ('Gulf') that include associated fishing regulations; and prohibit dredge fishing in all HAPCs that are managed with fishing regulations. Furthermore, the EPA understands that the proposed action will establish 15 new HAPCs with fishing regulations, establish 8 new HAPCs without fishing regulations, and prohibit dredge fishing in all HAPCs with fishing regulations in the Gulf.

More specifically, the EPA understands that the proposed action includes:

- Establishing the following areas as HAPCs with regulations prohibiting fishing with bottom tending gear: West Florida Wall, Alabama Alps, L&W Pinnacles, Scamp Reef, Mississippi Canyon 118, Roughtongue Reef, Viosca Knoll 826, Green Canyon 852, and AT 357.
- Establishing Viosca Knoll 862/906 as an HAPC with regulations prohibiting fishing with bottom tending gear, but allow royal red shrimp fisherman to keep their nets in the water in this area.
- Within the current Pulley Ridge HAPC, establishing a new HAPC with fishing regulations prohibiting all fishing with bottom tending gear, except for long line gear.
- Establishing the following areas as HAPCs without fishing regulation: Harte Bank, Southern Bank, South Reed; Garden Banks 299 and 535; Green Canyon 140, 272,234, and 354; Mississippi Canyon 751 and 885.

The EPA understands that the purpose of Amendment 9 is to protect coral species and essential fish habitat and maintain suitable marine fishery habitat quality and quantity to support sustainable fisheries in the Gulf. Since the proposed action impacts areas under the jurisdiction of the EPA Region 4 and 6 offices, both offices participated in the review of the DEIS.

It is unclear from our review of the DEIS if a scoping notice was provided to the public for the proposed action. The EPA notes that the Notice of Intent (NOI) was published on December 18, 2017, but it is unclear if a scoping request was included in the NOI. Scoping provides an opportunity to bring agencies and applicants together to lay the groundwork for setting time limits, expediting reviews where possible, integrating other environmental reviews, and identifying any major obstacles that could delay the process. The EPA supports a robust scoping process when an EIS is required. If a scoping notice was issued for the proposed action and public comment was taken, the EPA recommends that this information be more clearly discussed in the Final EIS.

The potential for the proposed actions to impact Environmental Justice (EJ) communities is discussed in Section 3.5.4 of the DEIS. It is acknowledged that "*data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on shrimp or reef fish specifically (participation).*" Even though there are data gaps that limit the EJ impacts analysis, the EPA supports the NMFS efforts to evaluate EJ impacts in the DEIS. The EPA continues to encourage the NMFS to collect EJ data for the fishing industries impacted by NMFS proposed actions.

It is stated in the DEIS: *"The purpose of this amendment is to protect coral species and habitat under federal management in the Gulf. The need for this action is to conserve the Gulf coral resources and EFH and to maintain suitable marine fishery habitat quality and quantity to support sustainable fisheries. This includes reviewing current fishing regulations within existing HAPCs and ensuring the regulations are sufficient and appropriate."* The EPA agrees that a HAPC designation does not, in and of itself, directly confer any additional specific protections to designated areas. However, it can be indirectly protective in that it will be taken into consideration in reviews of federal permitting actions: *"but can be used to focus attention on those areas when the Council considers the measures to minimize adverse impacts from fishing and when NMFS conducts the required consultations."*

Overall, the EPA supports measures taken by the NMFS and the Gulf of Mexico Fishery Management Council to expand protections for coral habitat in the Gulf. We agree that: *"Because all of the proposed HAPCs are already designated EFH there will be no additional administrative burden on renewable energy projects, construction projects, or oil, gas, and mineral exploration and mining."* Though the proposed preferred options may result in some minor economic and social impacts (fishery related) in the near-term, it is likely that over the long-term these effects should balance out due to additional protections afforded to fishery habitat and to managed fish stocks.

The EPA has rated this DEIS with a Lack of Objections ('LO') and concluded that the actions covered in the DEIS do not pose any immediate environmental concern regarding the overall scope of the proposed actions. However, the EPA recommends that potential social and economic impacts associated with the proposed actions be minimized to the extent practicable. Please provide the EPA with a copy of the Final EIS and a copy of the Record of Decision (ROD) when available.

The EPA appreciates the opportunity to review this DEIS. Should the NMFS have questions regarding these comments, please feel free to contact Mr. Dan Holliman, at (404) 562-9531 or by email at holliman.daniel@epa.gov.

Sincerely,

for

Carol J. Monell
Acting Director
Resource Conservation and Restoration Division

VI. Response to comments from the Environmental Protection Agency (EPA) on the Draft Environmental Impact Statement (DEIS) for Amendment 9.

Comment: It was unclear from the EPA review of the DEIS if a scoping notice was provided to the public for the proposed action. The EPA notes the Notice of Intent (NOI) was published on December 18, 2017, but it is unclear if a scoping request was included in the NOI.

Response: A summary of the comments from the scoping workshops have been added to the DEIS (see Section I above). The NOI itself was also a scoping invitation for the public to provide written comments on the preliminary issues. Additionally, the NOI informed the public that comments would be solicited at public hearings held by the Gul of Mexico Fishery Management Council (Council).

VII. Response to comments from the public on the DEIS for Amendment 9

The comment period was open from May 21, 2018 through July 20, 2018. The National Marine Fisheries Service (NMFS) received a total of 85,679 comments from individuals and organizations including the EPA. A total of 9 comments were not in favor of the amendment, 85,668 comments were in favor, and 2 comments were not specific to the amendment. In addition to these comments, the EPA (see Section IV above) gave the DEIS a LO (lack of objection) and the Department of Interior indicated it did not have any comments at this time. With regard to the different actions, those against proposed actions in Amendment 9 had various concerns dependent upon the interest they represented (e.g. fishing, environmental, oil and gas). The following are comments specific to actions in Amendment 9.

Comment: These regulations disproportionately impact commercial fishermen as the primary user group of the impacted areas. It is unfair to prohibit certain gear types without any solid scientific evidence of impacts to these areas of concern. Scientific data showing commercial fishing impacts to these areas should be presented in the DEIS.

Response: NMFS recognizes that due to the location of these areas commercial fishermen would be one of the entities impacted, and the DEIS addresses impacts to commercial fishermen throughout the document. As stated in the amendment, corals and their associated habitat are slow growing, fragile organisms that are particularly sensitive to physical impacts from fishing gear. Several scientific studies have documented impacts to deep sea corals from fishing gear and were cited in the document. As stated in the DEIS, in order to reduce impacts to fishermen, the Council held several workshops with fishermen to refine the list of proposed areas, their boundaries, and what if any rules regarding fishing would be implemented. Impacts to commercial fishing were reduced by not implementing a prohibition on bottom longline gear in the expanded Pulley Ridge area, establishing deep water HAPCs without additional fishing regulations, and the exemption for royal red shrimp gear in Viosca Knoll 862/906. As stated throughout the DEIS little or no known fishing activity occurs in most of the areas that are proposed for designation as HAPCs; therefore, these regulations would be generally proactive measures to restrict future effort, not restrict current effort.

Comment: The DEIS should take into consideration the economic impact these areas contribute to the commercial fishery and should also consider additional ways to mitigate user group conflicts with potential regulations that would prohibit certain types of “bottom-tending gear”.

Response: The DEIS analyzes the economic effects of each alternative on commercial and recreational fishing participants likely to be affected by the amendment. The analyses are contained in subsection 2 throughout Chapter 4, Regulatory Impact Review (Chapter 5), and Regulatory Flexibility Act Analysis (Chapter 6). These analyses use data on fishing activities by specific areas as recorded through VMS and ELB. NMFS recognizes that affected fishing activities would have ripple effects on commercial and recreational supporting industries (dealers, wholesalers, retailers, marinas, restaurants) beyond the harvest market. The DEIS provides general information regarding the commercial and recreational sectors’ economic impacts in terms of jobs, sales, income, and value added on the entire seafood industry, including the harvest, wholesale and retail markets. Quantifying the effects of each alternative on the commercial and recreational supporting industries is not possible due to lack of sufficient information. For the commercial sector, estimates of ex-vessel revenue changes are not available, and reactions from dealers, wholesalers, retailers, or restaurants to reduced availability of certain fish species is uncertain, especially that substitute species exist. For the recreational sector, the number of target trips for each alternative is not available, and substitute species or other fishing areas exist such that the reduction or absence of the opportunity to fish for certain species in each affected area may or may not affect the overall desire of anglers to take or pay for trips. The accompanying fishing regulations for each alternative, particularly on bottom-tending gear, are designed to balance the ability to protect corals and coral reefs with the potential socio-economic impacts on affected harvest and non-harvest fishing participants.

It is unclear what “user group conflicts” the comment is referring to. However, as noted in the response to the comment above, impacts to the commercial fishing industry were considered and exceptions to the prohibition on “bottom-tending gear” were made in specific areas, as appropriate.

Comment: The intent of allowing royal red shrimpers to have their nets in the water off the bottom should be better explained.

Response: In considering similar comments, language was added to the DEIS to clarify that “…the intent of this exemption is to allow royal red shrimpers to keep nets in the water within the boundaries of the Viosca Knoll 862/906 HAPC, not to have fishing gear contacting the coral.” These vessels use some of the longest lines and largest nets in the Gulf, making it impractical to haul nets completely out of the water while transiting the area. Therefore, in this area only, royal red shrimp vessels would be allowed to keep nets in the water, but off the bottom. This exemption would balance the need to protect the bottom with the need to continue to allow the historic use of the area by these fishermen.

Comment: Due to the presence of plate corals in Pulley Ridge, the exemption for bottom long line gear should be removed.

Response: NMFS recognizes the corals and habitat present in Pulley Ridge. As stated in the DEIS, the Council held several workshops with scientists and fishermen to refine the list of proposed areas, their boundaries, and what, if any, rules regarding fishing would be implemented. Because of the potential to significantly impact commercial fishers in the area, the Council selected, and NMFS agreed with, the preferred alternative to balance resource use and protection.

Comment: In Action 2, the preferred alternative should be Alternative 5, Option b, to designate the West Florida Wall as an HAPC with fishing regulations.

Response: In considering similar comments, and recommendation of the Scientific and Statistical Committee (SSC) to better protect this area as well as refine the area to reduce impacts to fishing, the Council took action at its April 2018 meeting to Make Action 2 Alternative 5 Option b its preferred alternative.

Comment: Fishing regulations should be added to all proposed HAPCs, specifically the deep-water coral areas proposed in Action 6.

Response: As stated in the DEIS, the Council proposed designating the areas in Action 6 as HAPCs because they contain coral communities that are rare. However, the Council also recognizes, and NMFS agrees, that, these areas are in depths which are unlikely to be impacted by fishing with bottom-tending gear now or in the foreseeable future. Therefore, the Council decided not to establish restrictions on the use of these gears in these areas. If new information on fishing practices indicates that bottom-tending gear is interacting with the bottom in these areas, the Council may consider imposing restrictions at that time.

Comment: Excluding all gear types except bottom-long line near Pulley Ridge is unfair and the area is too large to not think it would affect a number of fishermen.

Response: The Council did not choose to exclude all gear types except bottom-long line from the new Pulley Ridge South A HAPC. The prohibition applies only to bottom-tending gear. For this HAPC that includes trawl, buoy gear, pot or trap, and bottom anchoring by fishing vessels. The Council made the exception for bottom-longline gear because available information indicates that this is the only type of bottom-tending gear historically used in this area.

Comment: The DEIS states that the use of "deep sea coral zone" designations is duplicative and unnecessary, however, the use of HAPCs appears to be equally unnecessary. The "deep sea coral zone" designations should also be considered as alternatives in the DEIS. The DEIS should describe how the Council decided that the proposed areas are deserving of HAPC designations rather than deep sea coral zones. The DEIS must explicitly describe how each area meets the criteria for identification as a HAPC and explicitly address each of the four HAPC criteria for all areas under consideration as HAPC to provide a more robust justification for designating a new HAPC.

Response: Corals and coral reefs within Gulf federal waters are currently managed within a fishery management plan. Therefore, under section 303(a)(7) of the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act), the Council is required to designate essential fish habitat (EFH) for those managed corals and establish measures to minimize to the extent practicable adverse effects caused by fishing and identify other actions to encourage the conservation and enhancement of the EFH. Section 303(b)(2)(B) of the Magnuson-Stevens Act provides discretionary authority to minimize physical damage from fishing gear to deep-sea corals identified by the Deep Sea Coral Research and Technology Program. Because these areas of deep-sea corals are already designated as EFH, identifying these same areas as deep-sea coral areas under the discretionary authority would not provide any additional protection. However, the Council received new information through its Coral Working Group and Coral Scientific and Statistical Committee that supported identifying some of the previously designated EFH as HAPCs.

As stated in 50 C.F.R. § 600.815(a)(8) an area in which corals exist in sufficient numbers or diversity could be designated as an HAPC if one of the four criteria are met: significantly ecologically important, habitat that is sensitive to human induced degradation, located in an environmentally stressed area, or considered rare. These factors were considered in the draft environmental impact statement (DEIS). The DEIS explains that corals and coral habitat are especially sensitive to human-induced degradation by fishing and non-fishing activities because of their life history, and that the areas identified for HAPC designation are significantly ecologically important, sensitive to human induced degradation, or are considered rare. In the description of each area is information regarding the particular features of the area, including the corals and associated species that may make the area ecologically important and rare relative to nearby features.

Comment: The DEIS, and companion documents, do not include an adequate analysis of economic impact on non-fishing activities, or a sufficient cost-benefit analysis of the proposed action as required by Executive Order 12866. It was inappropriate to rely on the DEIS for the proposed Flower Garden Bank National Marine Sanctuary (FGBNMS) expansion to address the potential economic impacts to non-fishing industries such as oil and gas, renewable energy, and commercial shipping.

Response: As stated in the DEIS, an HAPC designation itself does not confer any additional specific protections to designated areas or impose any restrictions on industries because the areas considered for HAPC designation are already identified as EFH. Although designating HAPCs can be used to focus attention on those areas when NMFS consults with other federal agencies on proposed actions that may adversely affect EFH, these consultations do not impose any restrictions on non-fishing activities. A consultation may result in recommendations that can be taken by the other federal agency to conserve this habitat. However, any future recommendations would depend on the proposed federal action. The other federal agency, not NMFS, would decide whether to implement those recommendations. Therefore, neither the DEIS nor the Regulatory Impact Review, which serves as the basis for determining whether the regulations are a "significant regulatory action" under the E.O. 12866, discuss the economic impacts related to non-fishing activities or conduct a cost-benefit analysis related to these activities. NMFS did not rely on the DEIS for the FGBNMS expansion to address impacts to non-fishing industries. NMFS referred to this DEIS and incorporated it by reference in Section 3.4 (since removed in order to address concerns that it was being relied upon to address impacts to non-fishing industries), which is the description of the economic environment, and also identified the FGBNMS DEIS in Section 4.8, which addresses cumulative effects, because it relates to a reasonable foreseeable future action.

Comment: Impacts on oil and natural gas development are not minor, and designation of new HAPCs is not in accordance with Executive Order 13795. The DEIS should include a more comprehensive analysis of the potential impacts to offshore energy development.

Response: NOAA does not agree that this action is not in accordance with EO 13795. EO 13795 addresses various issues related to encouraging energy exploration and production, including direction to the Secretary of Commerce to refrain from designating or expanding any National Marine Sanctuary under the National Marine Sanctuaries Act unless the sanctuary designation or expansion proposal includes a timely, full accounting from the Department of the Interior of any energy or mineral resource potential within the designated area and the potential impact the proposed designation or expansion will have on the development of those resources. This executive order does not address the establishment of EFH or HAPCs. Further, as explained in the EIS and the response to comments above, an HAPC designation itself does not confer any additional specific protections to designated areas or impose any additional regulations related to offshore energy development and the additional regulations considered in the EIS apply only to fishing activities. Consultations on proposed federal actions that may adversely affect EFH are already required. Although proposed energy projects in the areas identified as HAPCs may be reviewed more carefully during an EFH consultation, the same standard applies. Specifically, the consultation determines whether a proposed action will result in adverse effects to EFH and, if so, provides recommended measures to conserve that habitat.

Comment: NMFS and the Gulf Council should describe how the DEIS alternatives integrate and/or overlap with existing regulations of other federal agencies and the current proposal by NOAA to expand the FGBNMS.

Response: The DEIS acknowledges other areas within the Gulf that exist or are being considered for additional management in Section 4.8. These include areas within the purview of the Council, those within National Marine Sanctuaries, and those co-managed by state and federal entities. None of the areas that exist or are being considered for designation in a subsequent action, are included in this amendment. The Council specifically excluded areas from consideration that could overlap with reasonably foreseeable future actions by other federal agencies.

Comment: BOEM should be consulted prior to the issuance of a final EIS.

Response: As stated in the DEIS, consultations were held with user groups that would be impacted by management measures within the authority of the Council, specifically management measures relevant to fisheries. BOEM has no special expertise or jurisdiction by law regarding establishing HAPCs. Had BOEM requested to be included in the development process, NMFS would have accepted.

Comment: The publication of the DEIS, the public comment period and the final action taken by the Gulf Council were disconnected and this process does not promote transparency.

Response: NMFS and the Council strive to integrate the Magnuson-Steven Act process with the NEPA process whenever practicable. However, each process has its own statutory requirements. Consistent with the Magnuson-Steven Act, the agenda for each Council meeting is published at least 14 days in advance of the meeting and detailed minutes of each meeting are kept and made available to the public. As summarized in Appendix E of the EIS, the Council also held public hearings on this amendment in May and June, 2018. The amendment was noticed for final action on the agenda for the June Council meeting, which took place from June 18 through June 21, 2018. Consistent with the requirements of NEPA, the EPA published the notice of availability of the integrated DEIS/Amendment 9 on May 21, 2018 with the comment period ending on July 5, 2018. However, NMFS requested the public comment period on the DEIS be extended because it published later than anticipated, which resulted in the comment period ending around the July 4th holiday. Therefore, the Council took final action on the amendment before the DEIS comment period ended. However, the Council was fully informed of all the public comments that had been received on the DEIS prior to the meeting, considered all of the comments and public input received through the Council process, and none of the comments on the DEIS that were received after the June Council meeting provided substantial new information. Thus, although the NEPA and Council processes were not perfectly aligned, both processes were transparent, and both the Council and NMFS received and reviewed all of the relevant information submitted.

Comment: The scope of the DEIS should reflect a comprehensive strategy and objectives for Gulf deep-water corals. The plan should be developed with input from all GOM stakeholders and be based on the best available scientific and economic information.

Response: As stated throughout the DEIS, the areas being considered were identified as part of larger strategic exploration of the Gulf, and based on emerging information and the best available science, which was evaluated by the Council's Coral Working Group and Coral SSC. The Council also specifically requested input on the areas from its Shrimp advisory panel (AP), Reef Fish AP, and Spiny Lobster AP, as well as royal red shrimp fishermen and bottom longline fishermen. All other stakeholders had many opportunities to provide input during Council meetings and public hearings, as well as by providing comments during scoping and on the DEIS.